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Front cover: *"Faltenklappe"*, in Chemnitz, 1784. Neues Systematischen Concylien Cabinet 7e band: pl. 47 figs 482.

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A new genus and species of stomatellid (Gastropoda, Trochidae) from the Philippines

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ABSTRACT

A black colored stomatellid from the Philippines is described as a new species. As it has a polished surface, it is probably a shell covered entirely by the mantle of the living animal and therefore considered to belong to a newly described genus.

Key words – Gastropoda, Trochidae, new genus, new species, Philippines

INTRODUCTION

For several years a characteristic elongate and black colored stomatellid species from the Philippines is offered in the seashell trade. It is sometimes offered by dealers as *Stomatella lintricula* (A. Adams, 1850), but this is a smaller species with a totally different sculpture and color. We could not find an existing name for this black species, so it is described as new. The sculpture on the outher surface of *Stomatella* Lamarck, 1816 species consists of spiral striae on the first teleoconch whorls, which in some species extend towards the apertural edge. But

in the present species the surface looks polished, the apex is visible but does not protrude from the surface. This smooth surface can be explained when the shell is completely covered by the mantle in living specimens, like species of Cypraeidae which also have a highly polished shell surface. Unfortunately, no information about the living animal is known to us. Because this polished feature, which is not seen in any other known stomatellid, we introduce a new genus to accomdate this unique species.

Abbreviations

L	Length of the shell
AMD	(collection of) Aart M. Dekkers, Purperend, the Netherlands
HD	(collection of) Henk Dekker, Winkel, the Netherlands
MNHN	Muséum national d'Histoire naturelle, Paris, France
NHMUK	Natural History Museum, London, United Kingdom

TAXONOMY

Superfamily Trochoidea Rafinesque, 1815
Family Trochidae Rafinesque, 1815
Subfamily Stomatellinae J. E. Gray, 1840

Nigrastomatella gen. nov.

urn:lsid:zoobank.org:act:82C1FBA8-B271-4A3C-AD67-6093AD464D55

Etymology. – Combination of black (in Latin: niger, nigra, nigrum), the color of the only known species, and *Stomatella*. Gender feminine.

Description. – Shell elongate fusiform, apex at the posterior margin, last whorl increasing strongly in size resulting in an ear-shaped model. Apex nearly flushes with the last whorl, not protruding. Shell internally strongly nacreous. This new genus differs from *Stomatella* Lamarck, 1816 [type species *Stomatella auricula* Lamarck, 1816, subsequent designation by Anton, 1838: 32] in having a shiny polished shell, no spiral ribs present on the outer surface, the apex is not protruding above the shell surface. The polished shell characteristics indicate that it is probably totally covered by the mantle of the living animal or might be even internal.

Type species: *Nigrastomatella nigerrima* sp. nov.

Nigrastomatella nigerrima sp. nov.

(Plate 1 Fig. 1a-d)

urn:lsid:zoobank.org:act:3A5730D1-D17F-4B0F-B551-EAE1573E1C2A

Stomatella lintricula (A. Adams, 1850) – Poppe, 2017: 522, pl. 1561 fig. 7a-c [not of A. Adams]

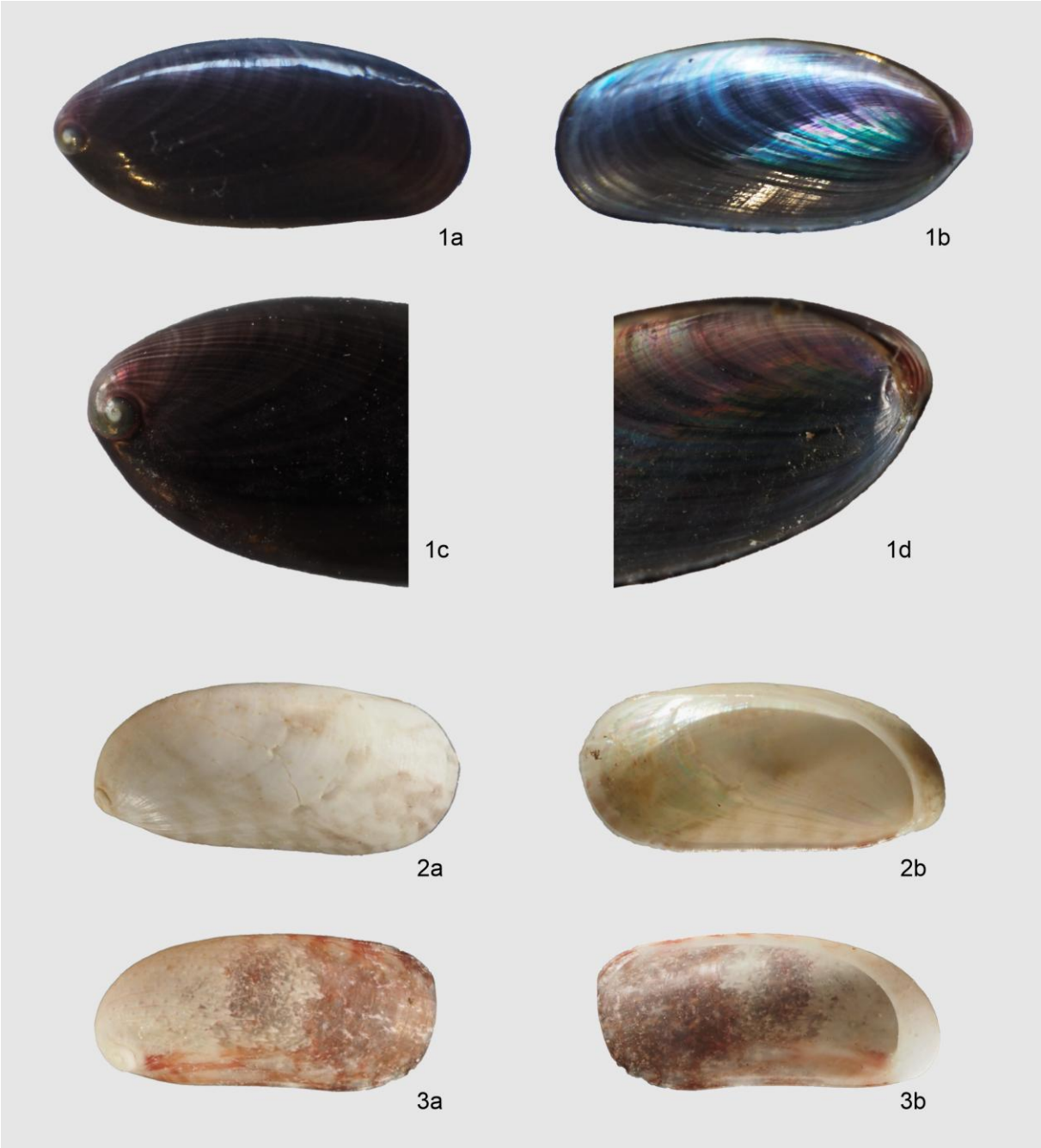

Plate 1. Stomatellinae species. Fig. 1. ***Nigrastomatella nigerrima* sp. nov.**, holotype, MNHN-IM-2000-40753, Philippines, Siquijor Island, L 11.9 mm. Figs 2-3. ***Stomatella lintricula*** (A. Adams, 1850). Fig. 2. HD 24634, Egypt, Red Sea, Sinai, Gulf of Aqaba, Dahab, S side Ras el-Kura, living below stone, 0.5 m depth at low tide, 26-27 Sept. 1992, L ± 8.3 mm. Fig. 3. HD 46911, Philippines, Siquijor Island, by net 150 m depth, bought 2021, L ± 6.8 mm.

Description. – Shell elongate fusiform, apex at the posterior margin, last whorl increasing strongly in size resulting in an ear-shaped model. Shell length to 13.7 mm. Apex nearly flushes with the last whorl, not protruding. The first whorls are whitish, protoconch not discernable. The last whorl has near the columellair side several dark reddish to blakish colored spiral lines which towards the aperture blend into the black color of the last whorl. From the ventral side several of the red spirals are visible at the apex. In full (sun-)light the shell is translucent to slightly transparant. The surface is very smooth and shining, it seems that part of the apex after formation is dissolved by the animal to obtain a totally smooth shell, but not any juveniles are available to confirm this observation. Shell internally strongly nacreous.

Holotype. – MNHN-IM-2000-40753 [Pl. 1 Fig. 1a-d], L 11.9 mm.

Paratypes. – Philippines: North Cebu, Borbon, 10-25 m, AMD, 2 [L = 11.0, 11.4 mm]; North Cebu, Borbon, HD 48664, 1 [L = 11.3 mm]; Siquijor Island, AMD, 2 [L = 12, 13.7 mm]; Siquijor Island, HD, 5 [L = 11.1, 11.3, 11.4, 11.4, 11.5 mm]; Aliguay island, trawled, 200 m, 9 Nov. 2015, HD 36900, 1 [L = 10.2 mm]; Mactan, Island, Punta Engaño, 2-5 m, 2016, HD 37881, 4 [L = 12.1, 12.1, 12.3, 12.4 mm]; Mactan, Island, Punta Engaño, at Bee Hotel, 5-10 m, 2017, HD 40597, 3 [L = 9.9, 10.6, 10.9 mm].

Type locality. – Philippines, Siquijor Island.

Distribution. – Only known from the Philippines and Guam (Bob Abela, internet site).

Habitat. – Not any information on habitat available, but the reported depths are from 2-25 m, one shell trawled from 200 m depth.

Etymology. – Derived from the Latin niger, nigerrima means strongly black colored.

Comparison. – There is not a closely similar species of stomatellid to compare with this new species. Several species of *Stomatella* may have blackish color variants, but they can always be discriminated by having a protruding apex, a not polished surface and the presence of clear fine spiral ribs on at least the apex, in some species extending towards the aperture. The most similar species in form is the little-known *Stomatella lintricula* (A. Adams, 1850), which is treated below.

***Stomatella lintricula* (A. Adams, 1850)**

Plate 1 Figs 2-3

Gena lintricula A. Adams, 1850: 38
Gena lintricula A. Adams, 1850 – A. Adams, 1854: 830, pl. 173 fig. 22
Gena lintricula A. Adams, 1850 – Sowerby II, 1874: pl. 1 fig. 1
Gena lintricula A. Adams, 1850 – Brazier, 1877: 48 [Sue Island, Torres Straits]

Gena lentricula [sic] A. Adams, 1850 – Pilsbry, 1890: 44, pl. 55 fig. 14
Gena lintricula A. Adams, 1850 – Schepman, 1908: 81
Stomatella lintricula (A. Adams) – Habe, 1964: 18, pl. 6 fig. 18
Stomatella lintricula (A. Adams, 1850) – Higo et al., 1999: 60
Stomatella lintricula (A. Adams, 1850) – Dekker & Orlin, 2000: 18
Stomatella lintricula (A. Adams, 1850) – Hasegawa, 2018: 119-120, fig. 4O-P

not: *Stomatella lintricula* (A. Adams, 1850) – Sasaki, 2017: pl. 23 fig. 2 [= *Stomatella planulata* Lamarck, 1816]

Type. – The broken holotype is in the NHMUK, nr. 1968131.

Type locality. – Philippines, Mindoro, Calapan City (A. Adams, 1850: 38).

Distribution. – This species has a wide distribution but seems to be rare everywhere. It is reported from: the Philippines (Adams, 1850, 1854; Sowerby II, 1874; herein); Japan (Habe, 1964, Higo et al., 1999; Hasegawa, 2018); Indonesia, Maluku prov., Maluku Barat Daya reg., Pulau Damar (Schepman, 1908); Indonesia, East Kalimantan, Berau Islands (herein); Australia, Queensland, Torres Strait, Sue Islet [= Warraber Islet] (Brazier, 1877); the Red Sea (Dekker & Orlin, 2000).

Material studied. – Egypt, Red Sea, Sinai, Gulf of Aqaba, Dahab, S side Ras el-Kura, living below stone, 0.5 m depth at low tide, 26-27 Sept. 1992, HD 24634, 1 spec. [Pl. 1 Fig. 2]; Indonesia, East Kalimantan, Berau Islands, by scuba diving, shell grit, 32 m depth, Oct. 2003, HD 44097, 1 broken spec.; Philippines, Siquijor Island, by net 150 m depth, bought in 2021, HD 46911, 1 spec. [Pl. 1 Fig. 3].

Remarks. – This is a typical species of *Stomatella*, its slender form makes it easily recognisable, all other species known to us are much wider in form. The apex is situated close to the posterior margin. Along the columella are a few broad spiral ribs. The surface is finely spirally striated; the striae disappear towards the aperture (Philippine & Indonesian specimens). The shell from Egypt does not show fine spiral striae. At least two decades ago, only one other shell has been seen from Egypt in another shell collection. The color is variable, whitish mottled, or white mottled with reddish. The slender form reminds one of *Nigrastomatella nigerrima* sp. nov., but the latter is always black and has a polished surface. The well-known *Stomatella planulata* Lamarck, 1816 is also relatively slender, but it differs in having a much larger shell (to ca. 26 mm), stronger spiral ridges, a flatter profile, and greenish brown coloration.

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Taxonomic chaos: A direct result of N. N. Thach's overenthusiastic taxonomy. Fixing the Fasciolariidae and Clavilithidae (Gastropoda, Neogastropoda)

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ABSTRACT

In 2025 the Vietnamese malacologist Nguyen Ngoc Thach described in his new, non-peer-reviewed and self-published, book 5 new genera and 208 new species / subspecies of Recent and fossil seashells, freshwater and land snails from Vietnam, Indonesia and some other countries. Several of the newly described taxa are co-authored by the Austrian malacologist Franz Huber and by the Hawaiian malacologist John Abbas. Despite the sincere effort to map the biodiversity of his country and to promote conchology, it cannot be denied that the low quality of the published photographs, imprecise locality data, deficient or absent literature surveys, and the lack of examination of type specimens raise reasonable doubts concerning the scientific value and validity of these taxa. In this paper, the Fasciolariidae taxa described by Thach are reviewed, and the necessary corrections are provided based on the available literature and examination of the type specimens. As a result, eight of the nine newly described taxa are placed in the synonymy of previously described species (new synonyms), and two are assigned to their correct genera (new combinations).

Key words – Gastropoda, Fasciolariidae, Clavilithidae, new synonyms, new combinations

INTRODUCTION

The Vietnamese malacologist Nguyen Ngoc Thach, sometimes in collaboration with colleagues, published in 2025 once more a book (Thach, 2025) in the same style as his previous works. In recent years, he has already published several non-peer-reviewed, self-

published books (listed in Páll-Gergely *et al.*, 2020: 36). Most taxa in these publications were described solely by Thach, but occasionally in collaboration with others, such as the Austrian malacologist Franz Huber and the Hawaiian malacologist John Abbas. The lack of peer review, the low quality of the published photographs, imprecise locality data, incomplete literature surveys, and the absence of examination, or even mention, of type specimens of relevant previously described species raise reasonable doubts about the validity of these taxa. The questionable reputation of Thach's publications has already been noted by other authors (e.g., Dekkers, 2023; Páll-Gergely *et al*., 2020, who referred to it as "taxonomic vandalism" in malacology), and I can only agree with this opinion. In his most recent publication, Dr. Thach (2025: 3) appears to have responded by stating that *"The book is dedicated to Genuine Malacologists who did not treat described species of other authors as synonyms by jealousy."* I would like to emphasize that the present paper is not motivated by jealousy. Rather, the primary concern is the maintenance of taxonomic stability and sound nomenclature, which necessitates the corrections proposed here.

MATERIAL AND METHODS

All scientific names of Thach mentioned in this study were validly introduced according to the ICZN Code, and thus, are available and validly introduced names. The published photographs of the specimens, as well as the actual type specimens described by Thach and his colleagues, were examined and compared with specimens from other sources and figures published in literature.

Abbreviations

MMP	Museo Malacologico Piceno, Cupra Marittima, Italy
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NHMUK	The Natural History Museum, London, UK
NHMW	Natural History Museum Vienna, Austria
NMBE	Natural History Museum Bern, Switzerland
RGM	Naturalis Biodiversity Center, Leiden, the Netherlands
RH	Roland Hadorn collection, Switzerland
SL	shell length

RESULTS - GENERAL REMARKS

In Thach's publications, type material was generally not examined; instead, illustrations were frequently taken from online sources or popular science books. His understanding of basic intraspecific variability differs markedly from that of recently active malacologists. Consequently, minor differences in shell morphology or coloration observed among individuals are often interpreted as diagnostic characters. This practice has led to an unrealistic inflation of species numbers across various genera and families, including the *Fasciolariidae*, a family in which substantial variation in shell shape and color pattern is commonly observed, even within single populations.

Several nominal species have been assigned to incorrect genera, indicating a general lack of knowledge of fasciolariid taxonomy. Moreover, the types or illustrated specimens are often immature, juvenile, or so weathered that subsequent taxonomic evaluation is severely hindered. The inadequacy of these descriptions stems from the absence of comparisons with previously described species, many of which are similar or even identical, as well as the reliance on minor shell characters known to be of limited taxonomic value. As a result, these publications have created a considerable burden for subsequent workers, who must undertake extensive efforts to stabilize nomenclature and evaluate the numerous taxa proposed by Thach and his colleagues.

TAXONOMY

Order Neogastropoda
Superfamily Buccinoidea Rafinesque, 1815
Family Fasciolariidae J. E. Gray, 1853
Subfamily Fusininae Wrigley, 1927

Genus ***Chryseofusus*** Hadorn & Fraussen, 2003
Type species *Fusus chrysodomoides* Schepman, 1911, by original designation

Chryseofusus frausseni (Thach, 2018) **new combination**
(Pl. 1 Fig. 1A-B)

Fusinus frausseni Thach, 2018: 29, figs 300-304, 306.
Chrysoefusus vietnamensis [sic] Thach, 2025: 61-62, pl. 48 fig. 316. **new synonym**

Remarks. – Thach (2018) erroneously assigned *Fusinus frausseni* to the genus *Fusinus* and overlooked the publication on the subgenus *Chryseofusus* by Hadorn & Fraussen (2003), in which the two species *C. valdiviae* and *C. dapsilis,* to which Thach compared his new species, were treated. *Chryseofusus* was originally described as a subgenus of *Fusinus* but raised to generic rank by Callomon & Snyder (2009: 167).
In 2025, Thach described *C. vietnamensis* but forgot that he had already described this species seven years earlier as *Fusinus frausseni*. Examination of the two holotypes has shown that *C. vietnamensis* is conspecific and therefore a junior synonym.
Additionally, the type locality of *F. frausseni* is the same as that of *C. vietnamensis* "off Nha Trang area, Khánh Hòa, Vietnam, at deep water", even though the depth differs slightly (150-250 m vs. 250-300 m).
Moreover, Thach consistently writes *Chrysoefusus* instead of *Chryseofusus*. Peer review could have avoided all these errors.

Genus ***Granulifusus*** Kuroda & T. Habe, 1954
Type species *Fusus niponicus* E. A. Smith, 1879, by original designation

Granulifusus humitakesekii (Thach, 2025) **new combination**
(Pl. 1 Fig. 2A)

Fusinus humitakesekii Thach, 2025: 62, pl. 48 figs 317-318.

Remarks. – This is a valid species but assigned to a wrong genus. It is a typical *Granulifusus*, yet Thach compared this species with *Fusinus pauciliratus complex* Snyder, 2000 from Japan and *Fusinus colombiensis* M. A. Snyder & N. C. Snyder, 1999 from the Caribbean region of Colombia! Neither of these species is similar to *Granulifusus*, making the comparisons meaningless. There are numerous *Granulifusus* species with which this new valid species could have been compared (e.g., *G. niponicus* (E. A. Smith, 1879), *G. hayashii* T. Habe, 1961, *G. kiranus* Shuto, 1958). Hadorn & Fraussen (2005) revised the genus *Granulifusus* - this would have provided a good basis for comparing the new species.

Granulifusus jeanpierrevezzaroi (T. Cossignani, 2017)
(Pl. 1 Fig. 3A-B)

Pseudolathyrus cf. kurodai – Springsteen & Leobrera, 1986: 177, pl. 48 fig. 1.
Fusolatirus kuroseanus – Thach, 2007: 118, pl. 29, no. 518 (not of Okutani 1975).
Pseudolatirus jeanpierrevezzaroi Cossignani, 2017: 14-15, text figs.
Pseudolatirus jeanpierrevezzaroi – Mallard & Robin, 2017: 152, figs 1-5.
Granulifusus jeanpierrevezzaroi (Cossignani, 2017) – Kantor *et al*., 2018: 24-27, figs 4C-D, 5.
Pseudofusus truongkhoai Thach, 2025: 63, pl. 48 figs 319-320. **new synonym**

Remarks. – The genus *Pseudofusus* Monterosato, 1884 is distributed in the Mediterranen Sea and adjacent northeastern Atlantic. Therefore, the placement of a species collected in Vietnam in this genus is not justified without additional evidence and a well-reasoned explanation. There is ample recent literature on the subject, if only it were consulted. All evidence suggests a confusion between *Pseudolatirus* and *Pseudofusus*, again reflecting insufficient familiarity with fasciolariid taxonomy.
Thach compares his *Pseudofusus truongkhoai* with *Pseudolatirus pallidus* (Kuroda & Habe, 1961) [a *Vermeijius*] and writes: “The new species is not similar to any species of *Fusinus* illustrated in Hadorn & Fraussen (2006).” This seems to be the only publication known to him that describes a few new fasciolariids, yet it includes no similar species. *Pseudolatirus pallidus* is the type species of the genus *Vermeijius* Kantor, Fedosov, Snyder & Bouchet, 2018, incidentally described in the same publication in which *Granulifusus jeanpierrevezzaroi* was redescribed and excellently illustrated.
During my visit in mid-April 2026 to the MNHN for the purpose of photographing Thach’s holotypes, it was found that the holotype MNHN-IM-2000-40157 had not (yet) been deposited at the MNHN. For comparison, a typical specimen from the NMBE collection is therefore illustrated instead of the holotype (Pl. 1 Fig. 3B).
Examination of the figured type material in Thach (2025: pl. 48 figs 319–320) has shown that *Pseudofusus truongkhoai* is a junior synonym of *G. jeanpierrevezzaroi*. Coincidentally, both share the same type locality (Nha Trang, Vietnam).

Subfamily **Peristerniinae** Tryon, 1880
Genus ***Peristernia*** Mörch, 1852
Type species *Turbinella nassatula* Lamarck, 1822, by subsequent designation Martens, 1868

Peristernia nassatula (Lamarck, 1822)
(Pl. 1 Fig. 4A-B)

Turbinella nassatula Lamarck, 1822: 110.
Peristernia nassatula – Mallard & Robin, 2017: 313, figs 1-4, 6-8 [fig. 5= *P.* sp.; figs 9-12= *P. forskalii forskalii*].
Peristernia vietnamense Thach, 2025 – 62-63, pl. 49 figs 321a; 322d [incorrect grammatical agreement of specific epithet – corrected by WoRMS to *vietnamensis*]. **new synonym**

Remarks. – Thach compares his supposedly new species with an image linked (fig. 321c) in WoRMS (https://www.marinespecies.org/aphia.php?p=image&pic=48015&tid=208048). This image shows two heavily encrusted specimens of *P. nassatula* from Taiwan, in which no diagnostic details are visible. Comparisons based on unverified online images cannot be considered a reliable method. Thach appears to assume that all images linked in WoRMS hold the same status as holotypes. However, WoRMS explicitly places a disclaimer on its website: "WoRMS does not exercise any editorial control over the information displayed here." *P. nassatula* is a common and rather variable species widely distributed in the western Pacific. The differences listed by Thach are best explained by intraspecific variation. Since there are no significant differences between the two taxa, they are treated as a single species, *P. nassatula*.

Genus ***Benimakia*** T. Habe, 1958
Type species *Turbinella rhodostoma* Dunker, 1860, by original designation

Benimakia lanceolata (Reeve, 1847)
(Pl. 1 Fig. 5A-C)

Turbinella lanceolata Reeve, 1847: pl. 3 fig. 12.
Benimakia lanceolata – Bouchet & Snyder, 2013: 334-336, figs 2A-D, 3B.
Benimakia lanceolata – Mallard & Robin, 2017: 215, figs 1-5.
Benimakia vietnamense Thach, 2025 – 63, pl. 47 figs 314-315 [incorrect grammatical agreement of specific epithet – corrected by WoRMS to *vietnamensis*]. **new synonym**

Remarks. – Thach (2025: fig. 314) selected a heavily water-worn, gerontic specimen with a broken and subsequently repaired rostrum as the holotype and compared it with the illustration in Reeve (1847: pl. 3, fig. 12). A gerontic specimen is not representative of the typical characteristics of a species, as very old individuals often differ markedly from juvenile or fully adult forms. Fortunately, paratype 1 (Thach, 2025: fig. 315) is a typical specimen and clearly shows that, once again, an unnecessary synonym was created based on an abnormal individual. The syntype figured by Reeve is housed in the NHMUK (NHMUK

1874.12.11.161) and is shown here for comparison (Pl. 1 Fig. 5A). A fresh, typical specimen from the MNHN collection is figured on Pl. 1 Fig. 5C.
B. lanceolata is a common and slightly variable species, widely distributed across the western Indo-Pacific. The differences cited by Thach are best interpreted as intraspecific variations. As there are no significant distinguishing features between the two taxa, they are treated as conspecific and regarded as a single species, *B. lanceolata*.

Order Neogastropoda
Superfamily Neogastropoda *incertae sedis*
Family **Clavilithidae** Vermeij & M. A. Snyder, 2018

Genus ***Clavilithes*** Swainson, 1840
Type species *Murex noae* Holten, 1802, by subsequent designation Herrmannsen, 1847

Clavilithes fennemai (K. Martin, 1906)
(Pl. 2 Fig. 6A-G)

Fusus (*Clavella*) *fennemai* K. Martin, 1906: 307-308, pl. 45 figs 729.
Clavilithes fennemai – K. Martin, 1921: 454, pl. 58 figs 26-27.
Clavilithes fennemai – Leloux & Wesselingh, 2009: 54, pl. 108 figs 6-7.
Clavilithes fennemai – Dharma, 2024: pl. 2 figs 6-8.
Nodolatirus abbasi Thach & F. Huber, 2025: 63-64, pl. 49 figs 323a,d,f; 325c-d. **new synonym**
Nodolatirus sukabumiensis Thach & Abbas, 2025: 64, pl. 49 figs 324; 325a-b. **new synonym**
Nodolatirus purpureus Thach & Abbas, 2025: 64, pl. 50 figs 326a-c. **new synonym**
Nodolatirus stevenliei Thach & Abbas, 2025: 64, pl. 50 figs 327a-c. **new synonym**

Remarks. – Thach & F. Huber as well as Thach & Abbas failed to compare their newly proposed species with *C. fennemai*. The reason for this omission remains unclear. Based on the available illustrations and comparison material, however, it appears to me that all of these purported new species are most likely nothing more than juvenile specimens of *C. fennemai* at different growth stages. *C. fennemai* is a rather variable species, and juvenile specimens differ markedly from adults. The spire may be either slender and elongated or shorter and broader, all of which can be attributed to intraspecific variation. Dharma (2024: pl. 2 figs 6-8) illustrated a growth series of *Clavilithes fennemai* exceptionally well. It would also be helpful if all "*Nodolatirus*" (*Clavilithes*) specimens were illustrated at the same scale, which would greatly facilitate comparison.
They assigned all four fossil species from Java to the fasciolariid genus *Nodolatirus* Bouchet & Snyder, 2013. Bouchet & Snyder (2013: 331-332) clearly defined the genus; among other characters, *Nodolatirus* possesses 2-6 characteristic raised, thickened cords at the adapical end of the rostrum, numerous fine lirae inside the aperture, three to as many as six columellar plicae, and a spiral sculpture of fine cords. None of the four described species exhibits any of these diagnostic features. The failure to consider existing modern literature and the general

lack of knowledge of fasciolariid taxonomy are evident here once again. Otherwise, one of the three authors would likely have considered comparing these new species with *Clavilithes*. Furthermore, none of the new species includes information on the stratigraphic units from which they originate, and their geological age is likewise not mentioned. Based on material in my own collection, these species can be assigned to the Middle Miocene.

CONCLUSIONS

In their 2025 book, Thach and his colleagues described nine new species of Fasciolariidae: five recent species from Vietnam and four fossil species from Java. Of these, eight are here regarded as new synonyms, while only one species is considered valid, although it was assigned to the wrong genus. The four fossil species were placed in *Nodolatirus* (Fasciolariidae), even though they actually belong to *Clavilithes* (Clavilithidae). In other words, the success rate for recognizing genuinely new species in this case is 11%. No further comments seem necessary.

ACKNOWLEDGEMENTS

I would like to thank Virginie Héros and Priscillia Bourguignon (MNHN) for providing the opportunity to study the type material, Mathias Harzhauser (NHMW) and Bunjamin Dharma (Indonesia) for their helpful comments regarding the Clavilithidae, and two anonymous reviewers for their valuable comments and suggestions, which helped improve the manuscript.

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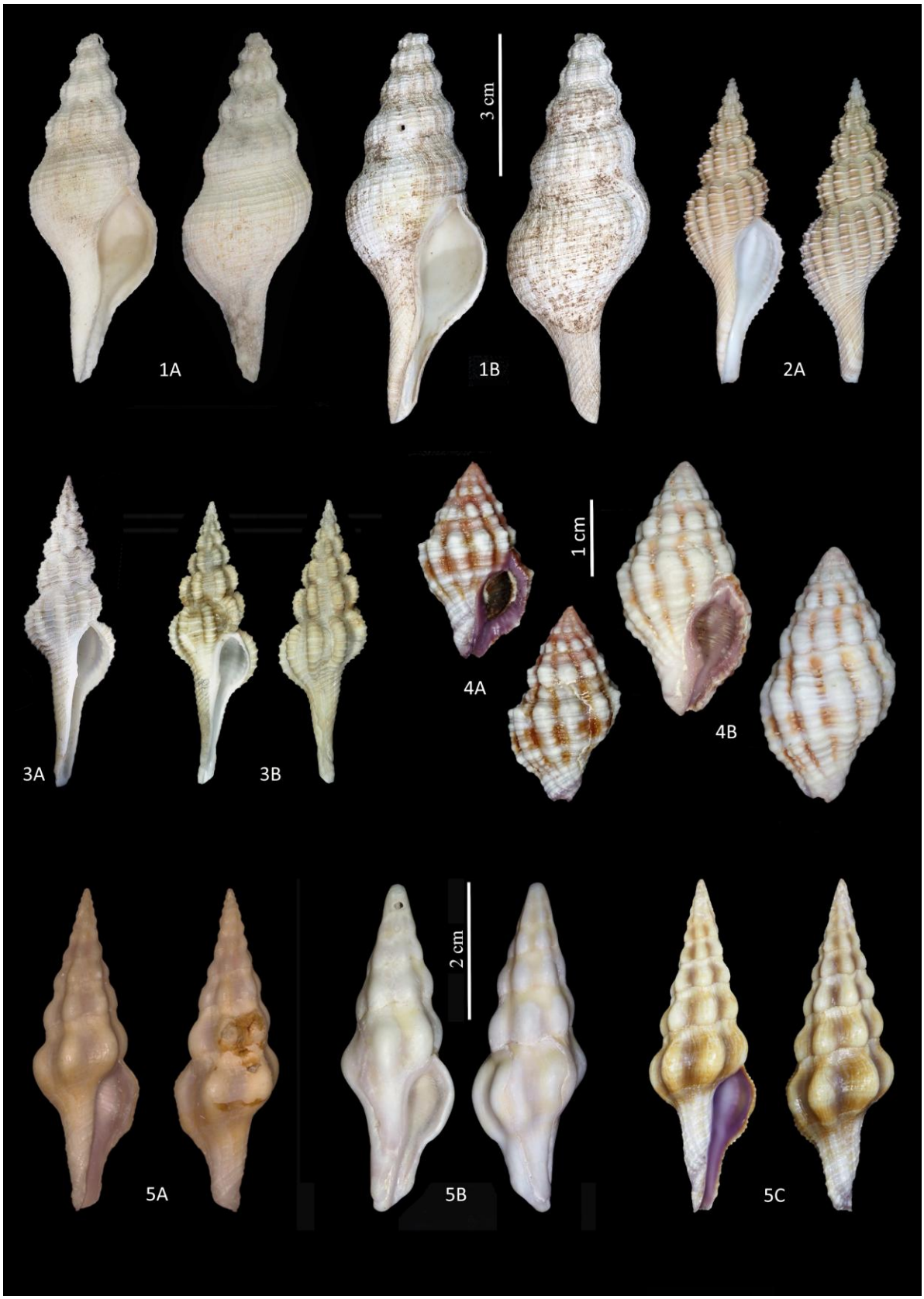

Plate 1. See next page for legend.

← **Plate 1.** Fig. 1A-B. ***Chryseofusus frausseni*** (Thach, 2018). A. Holotype MNHN-IM-2000-34024, *Fusinus frausseni* Thach, 2018, Vietnam, Khánh Hòa Province, Nha Trang, depth 150-250 m, SL 74.0 mm. B. Holotype MNHN-IM-2000-40152, *Chryseofusus vietnamensis* Thach, 2025, Vietnam, Khánh Hòa Province, off Nha Trang, depth 250-300 m, SL 82 mm (**new synonym**). Fig. 2A. ***Granulifusus humitakesekii*** (Thach, 2025). Holotype MNHN-IM-2000-40154, *Fusinus humitakesekii* Thach, 2025, Vietnam, Khánh Hòa Province, off Nha Trang, depth 100-120 m, SL 64.4 mm. Fig. 3A-B. ***Granulifusus jeanpierrevezzaroi*** (Cossignani, 2017). A. Holotype MMP, *Pseudolatirus jeanpierrevezzaroi* Cossignani, 2017, Vietnam, Khánh Hòa Province, Nha Trang, SL 66.3 mm. B. NMBE MOLL-0576456, Taiwan, South China Sea, SL 59.5 mm. Fig. 4A-B. ***Peristernia nassatula*** (Lamarck, 1822). A. NMBE MOLL-0576766, Philippines, Bantayan, SL 26.2 mm. B. Holotype MNHN-IM-2000-40156, *Peristernia vietnamensis* Thach, 2025, Vietnam, Quảng Ngãi, Lý Sơn Island, among rocks at 2-5 m, SL 34.0 mm (**new synonym**). Fig. 5A-C. ***Benimakia lanceolata*** (Reeve, 1847). A. Figured syntype NHMUK 1874.12.11.161, *Turbinella lanceolata* Reeve, 1847, Philippines, SL 45.9 mm. B. Holotype MNHN-IM-2000-40155, *Benimakia vietnamensis* Thach, 2025, Vietnam, Khánh-Hõa Ninh-Thuân area, near rocks on coral reefs, water-worn gerontic specimen, SL 48.3 mm (**new synonym**). C. MNHN, Bismarck Sea, Papua New Guinea, Madang, Pana Tibun islet, PAPUA NIUGINI stn PR33, SL 49.0 mm.
Different scales for Figs 1 to 3; Fig. 4; Fig. 5.

→ **Plate 2.** Fig. 6A-G. ***Clavilithes fennemai*** (K. Martin, 1906). A. Holotype RGM.9016, Nyalindung Formation (Middle Miocene), Indonesia, West Java, near Citalahab, SL ~80 mm (spire fragment). B. RH 34429, Nyalindung Formation (Middle Miocene), Indonesia, West Java, Sukabumi Regency, Jampang Tengah, SL 143.8 mm. C. RH 34370, Nyalindung Formation (Middle Miocene), Indonesia, West Java, Sukabumi Regency, Jampang Tengah, juvenile, SL 66.5 mm. D. Holotype MNHN-IM-2000-40158, *Nodolatirus abbasi* Thach & F. Huber, 2025, Indonesia, West Java, Sukabumi Regency, SL 65.1 mm (**new synonym**). E. Holotype MNHN-IM-2000-40159, *Nodolatirus sukabumiensis* Thach & Abbas, 2025, Indonesia, West Java, Sukabumi Regency, SL 57.6 mm (**new synonym**). F. Holotype MNHN-IM-2000-40195, *Nodolatirus purpureus* Thach & Abbas, 2025, Indonesia, West Java, Nyalindung, SL 45.6 mm (**new synonym**). G. Holotype MNHN-IM-2000-40196, *Nodolatirus stevenliei* Thach & Abbas, 2025, Indonesia, West Java, Nyalindung, SL 48.0 mm (**new synonym**).
Different scales for Fig. 6A-B and Fig. 6C-G.

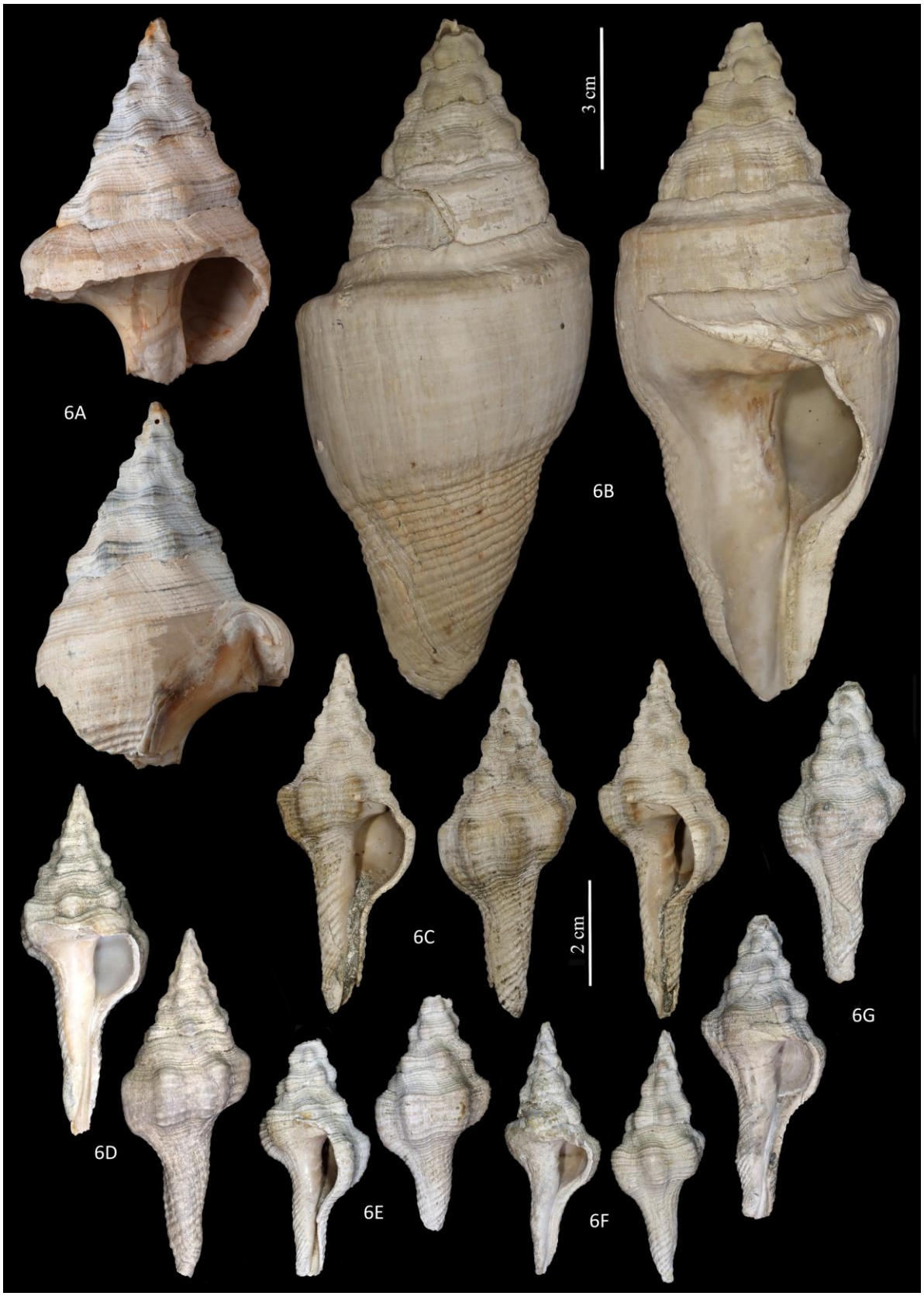

Plate 2. See previous page for legend.

Revision of the Volutilithinae Pilsbry & Olsson, 1954 (Gastropoda, Volutidae) from the lower Eocene of Gan (France, Aquitaine Basin) with a description of a new genus and species

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ABSTRACT

The Volutilithinae (Volutidae) from the lower Eocene of Gan were examined under UV light. This revealed their residual color patterns and allowed for a better definition of four species described by earlier authors. The results show: 1) that the type material of *Voluta deshayesiana* Rouault, 1850 included a figured juvenile specimen of *Sindhiluta prevosti* (Rouault, 1850) introducing confusion between the two species ; 2) that *Volutilithes ogormani* (Cossmann, 1923) is a subjective synonym of *Sindhiluta prevosti*, its type material based on juvenile specimens of this species ; 3) that part of the material of *Volutilithes* cf. *deshaysiana sensu* Cossmann, 1923 corresponds to a new species and a new genus *Alcithopsis insperata* gen. nov. sp. nov.

Key words – Systematic, Volutidae, Eocene, France, Aquitaine Basin, new genus, new species

INTRODUCTION

The present day Volutidae display a wide variety of shell color patterns that often allow them to be identified at the species level. In fossils, these patterns are not visible in natural light, but UV light can reveal their residual color patterns (Merle et al., 2008, Caze et al. 2012, Pacaud & Pons, 2013, Pacaud & Laporte, 2015, Pacaud, 2017, Pacaud & Ledon, 2023). The volutid shells, particularly those of the Volutilithinae from the Cuisian (upper Ypresian) deposit at Gan, were examined using this technique. Until now, four species of Volutilithinae were known from this locality: *Volutilithes deshayesianus* (Rouault, 1850), *Volutilithes ogormani*

Cossmann, 1923, *Sindhiluta prevosti* (Rouault, 1850) and *Pseudaulicina wateleti* (Deshayes, 1865). Examination under UV light of the first three species allows for better identification and reveals problems of interpretation by earlier authors. The aim of this paper is therefore to present the results concerning these three species and their systematic impact.

ABBREVIATIONS

H: height of shell
MNHN.F: Muséum National d'Histoire Naturelle, Collection de Paléontologie, Paris, France
UBT: Université Bordeaux Talence, France

MATERIAL

The studied material originates from various collections housed in the Muséum National d'Histoire Naturelle and in the University of Bordeaux 1. They are: O'Gorman coll. pars; Cossmann coll.; Pacaud coll.; Merle coll.; Varone coll. (all from MNHN); O'Gorman coll. pars (UBT).

METHOD

The residual color patterns were revealed by subjecting the shells to a procedure described in detail by Merle et al. (2008, 2025). First, the specimens were immersed in a concentrated sodium hypochlorite solution (solution of sodium hypochlorite at 9.6% chlorine) for 24 hours to enhance the residual color. Subsequently, the shells were exposed to UV light with a wavelength of 360 nm.

GEOGRAPHICAL LOCATION (Fig. 1)

The municipality of Gan is located nine kilometres south of Pau (France, Pyrénées-Atlantiques) on the RN134 road leading to Oloron-Sainte-Marie. The Tuilerie outcrop is located 200 m south of Gan railway station and 50 m west of the level crossing (Lambert II coordinates, southern zone, x = 378.17, y = 107.21, altitude 225 m).

Figure 1. Geographical location of Gan (Pyrénées-Atlantiques) in southwestern France.

GEOLOGICAL SETTING

During the early Eocene, the Gan area was inside the Northern Pyrenean Foreland Basin. The Marnes de Gan Formation was deposited between two main tectonic events: the first during late Ilerdian (end of early Ypresian) and the second at the Ypresian-Lutetian boundary (Gély & Sztrákos, 2000). Near Gan, maximum subsidence allowed several hundred meters of terrigenous sediments dated to the biozones P7–8 and NP12–13 (Nolf et al. 2002, Steurbaut & Sztrákos 2002). The old quarry known as the Tuilerie de Gan consists of clay beds about 50 m thick corresponding to the top of the Marnes de Gan. The Tuilerie de Gan is a famous site known for its highly diverse molluscan fauna (Cossmann & O'Gorman, 1923, Merle, 1986). Both benthic mollusk assemblages suggest a relatively deep environment of outer shelf to further offshore (circalittoral to epibathyal zones). Such assemblages are closely related to benthic communities with *Hinia* and *Cadulus* described by Baldi (1973) and correspond to muddy bottom characterized by a lack of algae and weak currents (Merle, 2000) at a depth of more than 120 m (Merle, 1985). Dolin & Ledon (2002), Lozouet (2004) and Merle & Roux, (2018) proposed the same interpretation and suggested that macrofauna of the Tuilerie de Gan inhabited epibathyal depths. Currently, only the lowest part is accessible, the top being buried under vegetation. Merle (1985, 1986) distinguished six layers from base to top:

• Bed 1: 6.60 m of blue-gray clay characterized by splintered fragments and without macrofossils.
• Bed 2: 0.60 m of blue-gray silty clay with abundant *Nummulites*, macrofossils and dominated by *Sigmesalia duvali* (Rouault, 1850) and *Hemiconus rouaulti* (d'Archiac, 1850).
• Bed 3: 1.70 m of blue-gray clay, poor in macrofossils, dominated by *Varicorbula archiaci* (Rouault, 1850) and *Conomitra hordeola* (Deshayes, 1865).
• Bed 4: 1.00 m of blue-gray silty clay with *Nummulites* and abundant macrofossils dominated by *S. duvali* and *Varicipotamides pratti* (Rouault, 1850).
• Bed 5: 0.40 m of beige to reddish indurated sandy clay with *Nummulites* and abundant macrofossils dominated by *Lunulites punctatus* Leymerie, 1846 (bryozoan) and ''*Serpula*'' *subgranulosa* Rouault, 1850 (Polychaeta, annelid).
• Bed 6: 5.90 m of blue-gray clay characterized by splintered fragments and with sparse macrofossils, at the lowermost base.

Material collected between the 1980s and 2000 (Pacaud, Merle and Varone collections) comes from beds 2 or 4. Older material from the O'Gorman and Cossmann collections may also originate from these beds, but this cannot be confirmed with certainty.

TAXONOMY

Superfamily Volutoidea Rafinesque, 1815
Family Volutidae Rafinesque, 1815
Subfamily Volutilithinae Pilsbry & Olsson, 1954

Genus ***Sindhiluta*** Merle & Pacaud, 2014
Type species: *Sindhiluta lakhraensis* Merle & Pacaud, 2014, by original designation
Origin: early Eocene, Lakhra Formation (Sindh, Pakistan)

***Sindhiluta prevosti* (Rouault, 1850)**
(Fig. 2.1-2, Pl. 1 Figs 1-3)

Mitra prevosti Rouault, 1848: 204. Nomen nudum.
Voluta prevosti Rouault, 1850: 499, pl. 18 fig. 14 – Cossmann, 1923: 134, pl. 8 fig. 14.
Voluta deshayesiana var. *A* Rouault, 1850: pl. 18 fig. 18 only. [*non Voluta deshaysiana* Rouault, 1850: pl. 18 figs 17, 19].
Psephaea (Eopsephaea) atacica Doncieux, 1908: 58, pl. 3 fig. 5a, b.
Psephaea (Eopsephaea) rabetensis Doncieux, 1908: 59, pl. 3 fig. 6.
Volutilithes ogormani Cossmann, 1923: 136, pl. 9 figs 3-4 and pl. 10 fig. 3 only.
?*Lyria prevosti* – Merle, 1986: 37.
Sindhiluta prevosti – Merle & Pacaud, 2014: 128.

Type material. – No material from Alexandre Rouault's collection has been located (Merle, 1990) and it is therefore presumed lost. However, Rouault's figure (1850: pl. 18 fig. 14) is very clear and it is not necessary to designate a neotype, it is reproduced herein (Fig. 2.2).

Type locality. – France, Pyrénées-Atlantiques, Bosdarros. Marnes de Gan (upper Ypresian).

Material examined. – France, Aquitaine Basin, Pyrénées-Atlantiques, Gan (Tuilerie): 20 spms (Varone coll.), MNHN.F.A72355, A72379, A72381, C02711; 2 spms (Pacaud coll.), MNHN.F.C02710 and C02712; 77 spms (Merle coll.), MNHN.F.A49251, A49252 et A98278; 20 spms (Combaut coll.), MNHN.F.A90795 and A90803; 1 spm (Cossmann coll.), MNHN.F.J14498. Aude, Coustouge: 2 spms (Cossmann coll.), MNHN.F.J14650 and J14702.

Original description. – « Cette coquille est turriculée, ovale, présentant des stries d'accroissement nombreuses et serrées. Sa spire a dix tours qui sont ornés à leur partie supérieure de stries transverses un peu plus fortes que les précédentes ; ce dernier n'en possède que sur une longueur égale à celle du tour précédent. Ce tour et l'avant-dernier sont légèrement bordés ; l'ouverture est allongée, étroite ; elle se prolonge supérieurement en un canal court situé dans la callosité du bord gauche ; la columelle est épaisse, tordue à sa partie

inférieure, et elle se relève postérieurement en s'infléchissant à gauche ; elle est munie de trois plis presque égaux placés entre des plis rudimentaires ; le bord droit est épais, mais tranchant à sa naissance ». Rouault (1850: 499).
English translation: This shell is turriculate, oval, with numerous, closely spaced growth lines. Its spire has ten whorls, which are decorated at the top with transverse lines that are slightly stronger than the previous ones; the latter only has lines over a length equal to that of the previous whorl. This whorl and the penultimate one are slightly edged; the aperture is elongated and narrow; it extends superiorly into a short canal located in the callosity of the left edge; the columella is thick, twisted at its lower part, and rises posteriorly, bending to the left; it has three almost equal folds placed between rudimentary folds; the right edge is thick but sharp at its base.

Descriptive supplement. – Residual color pattern only present in juvenile specimens. Pattern (description based on specimen Pl. 1 figs 1b, 2) consisting of two components: (1) spiral fluorescent stripes and (2) a dark, non-fluorescent background. On first four teleoconch whorls, two major stripes, one on posterior part of whorl and one on anterior part of whorl. On fifth teleoconch whorl, appearance of secondary stripes between the major stripes. On last whorl and on ventral face, around 16 major and secondary stripes and on dorsal face 11 major stripes.

Remarks. – In his work on Bosdarros, Rouault (1850) introduced two new species *Voluta prevosti* and *Voluta deshayesiana*. The illustrated specimen of *Voluta prevosti* is an easily identifiable adult. It displays costate early whorls and its last whorl is smooth. However, in his

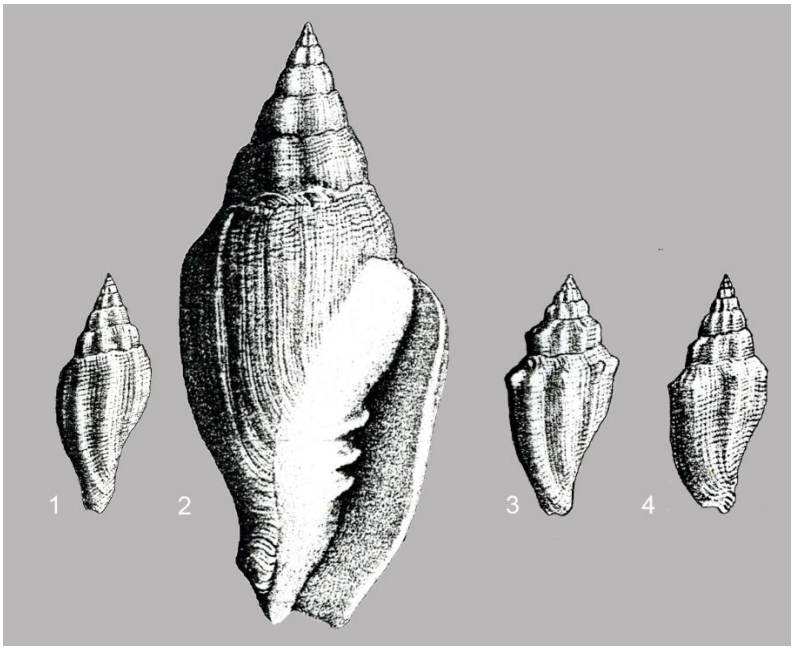

Figure 2. Original figures *Sindhiluta prevosti* (Rouault, 1850) and *Volutilithes deshayesianus* (Rouault, 1850) from Bosdarros (Pyrénées-Atlantiques, France). 1. juvenile of ***S. prevosti*** identified as *Voluta deshayesiana* var. A (pl. 18 fig. 18), H 32 mm; **2.** adult of ***S. prevosti*** (pl. 18 fig. 14), H 72 mm. **3**. juvenile of ***V. deshayesiana*** var. B (pl. 18 fig. 19), H 30 mm; **4**. juvenile of ***V. deshayesiana*** typical form (pl. 18 fig. 17), H 30 mm.

illustrations depicting *Voluta deshayesiana*, Rouault (1850) presented a specimen that he called: *Voluta deshayesiana* var. A (pl. 18 fig. 18). This specimen can be easily distinguished from typical *Voluta deshayesiana* by its elongated ribs, which are not weakly spinous at the shoulder, but it corresponds to a juvenile of *V. prevosti*. Later, Cossmann (1923: 137) described *Volutilithes ogormani* and refered to the figure of *Voluta deshayesiana* var. A (pl. 18 fig. 18) of Rouault (1850) and said that it corresponds to another species. However, like Rouault (1850), Cossmann (1923) did not understand that this specimen and some of those he illustrated from Gan (pl. 9 figs 3-4 and pl. 10 fig. 3) corresponded to juveniles of *V. prevosti*. Therefore, *Volutilithes ogormani* (Cossmann, 1923) is a junior subjective synonym of *Voluta prevosti* Rouault, 1850. According to Merle & Pacaud in Merle et al. (2014), *Psephaea (Eopsephaea) atacica* Doncieux, 1908 and *Psephaea (Eopsephaea) rabetensis* Doncieux, 1908 from the Ypresian of Corbières (Aquitaine Basin) are two other junior subjective synomyms of *V. prevosti*, which is now attributed to the genus *Sindhiluta* Merle & Pacaud, 2014.

Genus ***Volutilithes*** Swainson, 1931
Type species *Voluta muricina* Lamarck, 1803, by subsequent designation (Dall, 1906)
Origin: middle Eocene, Lutetian (Paris Basin)

***Volutilithes deshayesianus* (Rouault, 1850) comb. nov.**
(Fig. 2.3-4, Pl. 1 Fig. 4)

Voluta striatula Rouault, 1848: 204. Nomen nudum. [non Schröter, 1804, nec Brocchi, 1814, nec Megerle von Mühlfeld, 1829].
Voluta deshayesiana Rouault, 1850: 500, pl. 18 figs 17, 19 only.
Volutilithes ogormani Cossmann, 1923: 136, pl. 9 figs 1-2, pl. 10 fig. 2 only.
Volutilithes cf. *deshaysianus* – Cossmann, 1923: 135, pl. 8 fig. 5 var. dimorphe et étroite only.

Type material. – As mentioned above, none of the material from Alexandre Rouault's collection has been found (Merle, 1990). As numerous problems have arisen regarding the interpretation of this species, we designate a neotype from Gan (Tuilererie), as the Bosdarros site no longer exists. The selected specimen MNHN.F.A48091 (Pl. 1 Fig. 4) is from the O'Gorman collection, and it is a well-preserved adult showing residual color pattern.

Other material examined. – France, Aquitaine Basin, Pyrénées-Atlantiques, Gan (Tuilerie): 1 spm (figured in Cossmann 1923, pl. 8 fig. 5), MNHN.F.J08143 (Cossmann coll.); 8 spms, MNHN.F.J12669 (Cossmann coll.); 2 spms, MNHN.F.J12671 (O'Gorman coll.); 3 spms, MNHN.F.A72366 (Varone coll.); 5 spms, MNHN.F.A72470 (Varone coll.); 1 spm, MNHN.F.C02708 (Merle coll.); 2 spms, MNHN.F.C02709 (coll. Pacaud); 1 spm, UBT 29.2131.2 (O'Gorman coll.).

Type locality. – France, Pyrénées-Atlantiques, Gan, Tuilerie. Top of the Marnes de Gan (Ypresian).

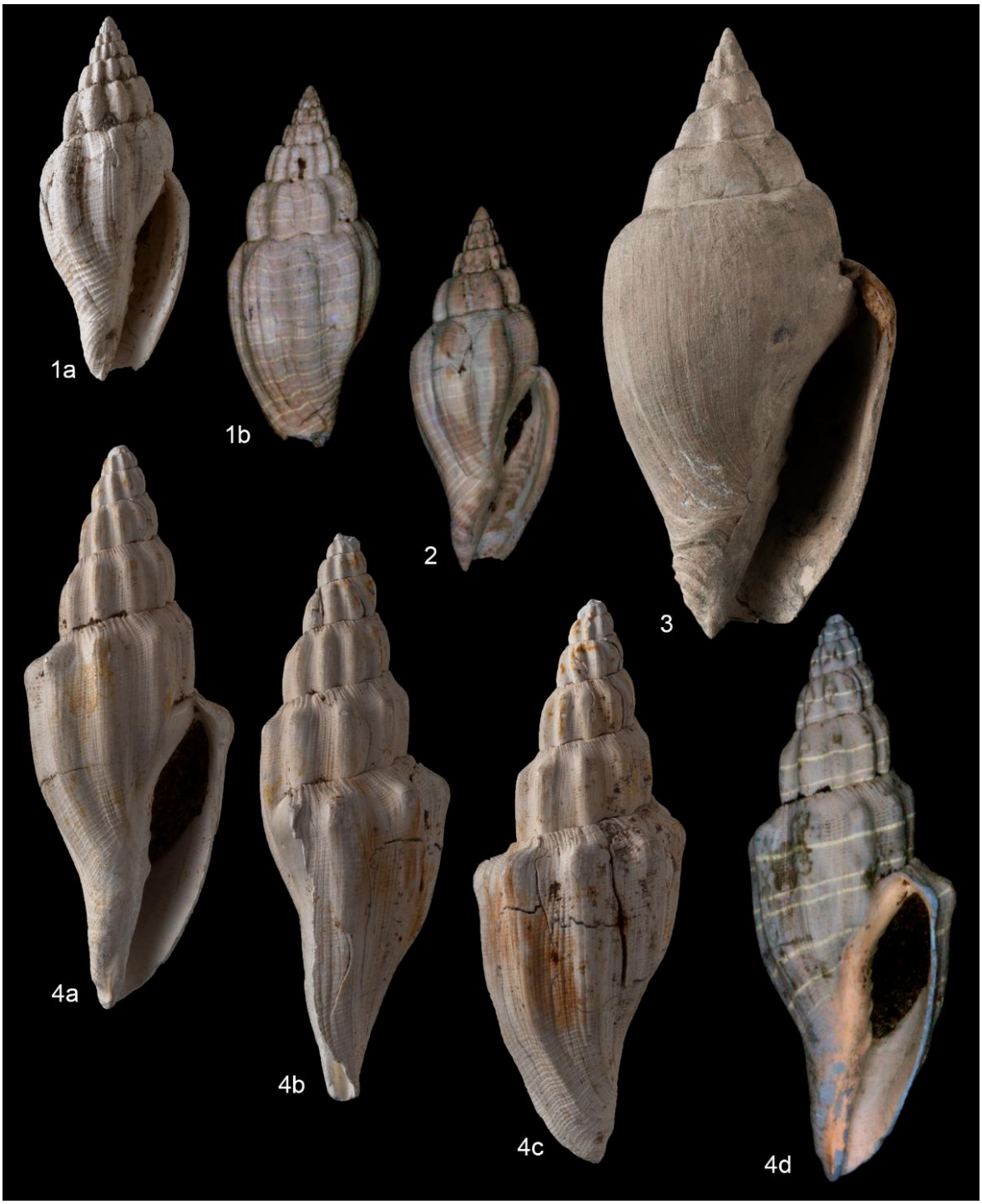

Plate 1. *Sindhiluta prevosti* (Rouault, 1850) and *Volutilithes deshayesianus* (Rouault, 1850) from Ypresian of France, Pyrénées-Atlantiques, Gan, La Tuilerie. Figs 1-3. ***S. prevosti***. Fig. 1. MNHN.F.C02710 (Pacaud coll.), juvenile specimen, H 25.1 mm, in natural light (1a) and under UV light (1b) with the residual color pattern. Fig. 2. MNHN.F.C02712 (Pacaud coll.), juvenile specimen, H 25.3 mm, under UV light with the residual color pattern. Fig. 3. MNHN.F.C02711 (Varone coll.), adult specimen, H 66.0 mm. Fig. 4. ***V. deshayesianus***, neotype MNHN.F.A48091 (O'Gorman coll.), designated herein, H 53.7 mm, in natural light (4a-c) and under UV light (4d) with the residual color pattern. Credits P. Loubry.

Original description. – « Ces Volutes sont voisines, par leur forme générale, des *V. muricina*, *costaria* et *torulosa* ; mais elles s'en distinguent fort bien par la présence de stries transverses qui ornent toute la surface, ainsi que par la disposition des plis de la columelle. La *V. Deshayesiana* est une coquille ovale, à spire aiguë, composée de dix tours subconvexes ; les trois premiers sont lisses ; les autres sont ornés de stries transverses fines et serrées, et pourvus de sept à neuf côtes longitudinales. Le dernier tour est un peu plus long que la spire. L'ouverture est allongée, étroite. La columelle est tordue inférieurement; elle est garnie de six à huit plis ; les quatre inférieurs sont les plus gros ; les supérieurs sont au nombre de deux à trois, le plus souvent trois, et quelquefois le troisième est double. Le bord gauche est lisse et brillant; le bord droit, mince et tranchant. L'espèce-type a ses côtes subanguleuses, dans la variété A, elles sont subconvexes, et la variété B est plus renflée et a ses côtes anguleuses ». Rouault (1850: 500).
English translation: These volutids are similar in general shape to *V. muricina*, *costaria* and *torulosa*, but they can be easily distinguished by the presence of spiral striations covering the entire surface, as well as by the arrangement of the columellar folds. *Voluta deshayesiana* is an oval shell with a sharp spire, composed of ten subconvex whorls; the first three are smooth; the others are decorated with fine, closely spaced spiral striations and have seven to nine axial ribs. The last whorl is slightly longer than the spire. The aperture is elongated and narrow. The columella is twisted anteriorly; it has six to eight folds; the lower four are the largest; there are two to three upper folds, usually three, and sometimes the third is double. The inner lip is smooth and shiny; the outer is thin and sharp. The type species [the type form] has subangular ribs, in variety A they are subconvex, and variety B is more swollen and has angular ribs.

Descriptive complement. – Pattern (description based on the neotype, Pl. 1 Fig. 4) consisting of two components: (1) spiral fluorescent stripes and (2) a dark, non-fluorescent background. On first three teleoconch whorls, one stripe on the middle of whorl. On fourth teleoconch whorl, appearance of a second stripe on abapical part of whorl. On penultimate whorl, appearance of a third stripe close to abapical suture. On last whorl and on ventral face, six fairly wide spaced stripes, with second and third (visible on penultimate whorl) being closers spaced.

Remarks. – As mentioned above, Rouault (1850) included a juvenile specimen of *Voluta prevosti* (= *V. deshayesiania* var. A) in the type material of *Voluta deshayesiana*. However, juveniles of *V. deshayesiana* are clearly distinguishable from juveniles of *V. prevosti* by weakly spinous ribs that clearly delineate the shoulder. Rouault (1850) distinguished them by naming them *V. deshayesiana* typical form and *V. deshayesiana* var. B (see the original description above). Considering the small size of these specimens of *V. deshayesiana* presented by Rouault (1850), which do not exceed 30 mm, this author did not have adult specimen of this species in his possession. Later, Cossmann (1923) introduced specimens of *V. deshayesiana* in the type material of *Volutilithes ogormani* (pl. 9 figs 1-2 and pl. 10 fig. 2), which contains mainly juveniles of *V. prevosti*. On the other hand, Cossmann (1923) illustrated a large specimen of 42 mm in height (pl. 8 fig. 5, MNHN.F.J08143) under the name *Volutilithes* cf. *deshaysianus* « var. dimorphe et étroite » and in the O'Gorman collection housed at Bordeaux, there is another similar large specimen of 48 mm in height. In the O'Gorman collection housed in the MNHN, there is a third large specimen (MNHN.F.A48091) of 53.7 mm in height and very well preserved and used herein for the

designation of the neotype of *V. deshaysianus*. These large specimens, whose first whorls bear the same ornamentation as that of the juveniles depicted by Rouault (1850), correspond to the adult stage of the species, showing that it continues to produce ribs, unlike *Sindhiluta prevosti*. Moreover, the neotype also displays under UV light a residual color pattern consisting of fewer spiral stripes than in *Sindhiluta prevosti* and persisting in the adult stage (see Pl. 1). As Rouault (1850) noted, the characteristics of the shell of *V. deshayesianus* are reminiscent of those of *V. muricinus*, the type species of the genus *Volutilithes*. Its residual color pattern, consisting of fluorescent spiral stripes, is also found in this Lutetian species and in another Lutetian species *V. friderici* (Bayan, 1870), see Merle *et al.* (2008, pl. 30 figs 3-4). Therefore, *V. deshayesianus* is attributed without hesitation to *Volutilithes*. Finally, two mentions of *Volutilithes* cf. *deshayesianus* still need to be discussed. First, *V.* cf. *deshayesianus* sensu Krach (1963: 106-107, pl. 19 fig. 16-16a) from the Paleocene (Thanetian) of Blizne and Płosina (Poland) differs from *V. deshayesianus* by having a wider shape and more spiny axial ribs. It belongs undoubtedly to a different and unnamed species. Its characters allow it to be classified within the genus *Volutilithes*. Second, *V.* cf. *deshayesianus* sensu Cossmann (1923: 135-136, pl. 8 figs 3-4 only) corresponds to an intriguing shell, which is not *Volutilithes deshayesianus*. It is the subject of the systematic treatment given below.

***Alcithopsis* gen. nov.**

urn:lsid:zoobank.org:act:8C642ADF-9D63-4A55-A4B9-EBB131C5F388

Origin: early Eocene (France)

Type species. – *Alcithopsis insperata* sp. nov.

Etymology. – Name given to highlight similarities with *Alcithoe fusus* (Quoy & Gaimard, 1833). Present day, New Zealand. Gender female (termination in *-opsis*).

Diagnosis. – Medium-sized, fusiform shell with high spire. Smooth protoconch with large, rounded nucleus. Axial ribs thick, opisthocyrte, nodular posteriorly. No spiral sculpture. Last whorl broad, slightly constricted at the neck. Narrow aperture. Four strong and oblique columellar folds. Residual color pattern consisting of axial zigzag stripes forming transverse imbrications.

Included species. – Only the type species, *Alcithopsis insperata* sp. nov.

Comparisons. – Compared to Volutilithinae, *Alcithopsis insperata* sp. nov. resembles *Volutilithes* in its elongated shape, slightly constricted at the neck, and in its elongated ribs. It differs from *Volutilithes* by having strong columellar folds and a color pattern of axial zigzag stripes, which is never found in *Volutilithes*. *Pseudaulicina* Chavan *in* Furon & Kouriatchy, 1948 (type species *Voluta musicalis* Lamarck, 1803, by original designation), like *Alcithopsis*, has strong columellar folds, but is easily distinguished by its stronger ribs, which are generally quite spiny, and have a broader shape. The color pattern, consisting of small, elongate stripes spirally aligned in *P. wateleti* (Deshayes, 1865) from the Ypresian of the

Paris and Aquitaine basins or of fairly wide spiral bands in *P. mitrata* (Deshayes, 1835) and *P. musicalis* (Lamarck, 1802) from the Lutetian of the Paris Basin (Merle et al., 2008: pls 29-30), also differs markedly from that of *Alcithopsis*. The presence of large columellar folds in *Alcithopsis* is also reminiscent of *Eovoluta* Pacaud, 2016 (type species *Eovoluta iolinensis* Pacaud, 2016, original designation; Lutetian, Paris Basin) and type genus of the subfamily Eovolutinae Pacaud, 2016. However, species of this genus often have spiral sculpture, sometimes have a strong denticle in the posterior part of the outer lip, and do not have residual color patterns. Subangular ribs, a fairly narrow shape and, above all, a color pattern composed of imbricated zigzag stripes are also reminiscent of *Alcithoe fusus* (Quoy & Gaimard, 1833), a species found in New Zealand and classified in the subfamily Cymbiinae H. Adams & A. Adams, 1853, tribe Alcithoini Pilsbry & Olsson, 1954. However, *Alcithoe* species are distinguished by a more flared aperture abapically and significantly less prominent columellar folds. These differences with the Volutidae of the European Eocene and with *Alcithoe* justify the introduction of the genus *Alcithopsis* gen. nov. The color pattern composed of imbricated zigzag stripes in *Alcithopsis* deserves discussion. This is the first occurrence of this pattern in Eocene Volutidae, which, with the exception of *Mitreola* Swainson, 1833, only bear fluorescent spiral stripes. Rare in the Eocene, this type of pattern is common among present day volutids and does not allow for reliable subfamilial attribution. It therefore seems preferable to place *Alcithopsis* in the Volutilithinae due to the shape similarities it shares with *Volutilithes*.

***Alcithopsis insperata* sp. nov.**
(Pl. 2 Figs 1-2)

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Volutilithes cf. *deshaysianus* – Cossmann, 1923: 135, pl. 8 fig. 3-4 only [non *Voluta deshaysiana* Rouault, 1850]

Type material. – France, Aquitaine Basin, Pyrénées-Atlantiques, Gan (Tuilerie): holotype MNHN.F.J12672 (O'Gorman coll.). One paratype UBT 29-2-131-1 (O'Gorman coll., figured in Cossmann, 1923: pl. 8 figs 3-4).

Type locality. – France, Pyrénées-Atlantiques, Gan, Tuilerie. Top of the Marnes de Gan (Ypresian).

Measurements. – Holotype: height, 64.0 mm; width, 22.1 mm. Paratype: height, 67.6 mm; width, 22.3 mm.

Etymology. – From the Latin adjective *insperatus* / *insperata* / *insperatum* meaning unexpected, due to its enigmatic color pattern among Eocene volutids.

Description. – Shell medium-sized, thick, fusiform, biconic. Protoconch smooth, of about 1½ whorl, with large, rounded nucleus. Spire high, moderately wide, apical angle of 35°. Teleoconch of eight whorls, moderately convex. Suture linear. Axial sculpture of about ten thick, opisthocyrt ribs. Ribs narrower than their intervals, extending from one whorl to next,

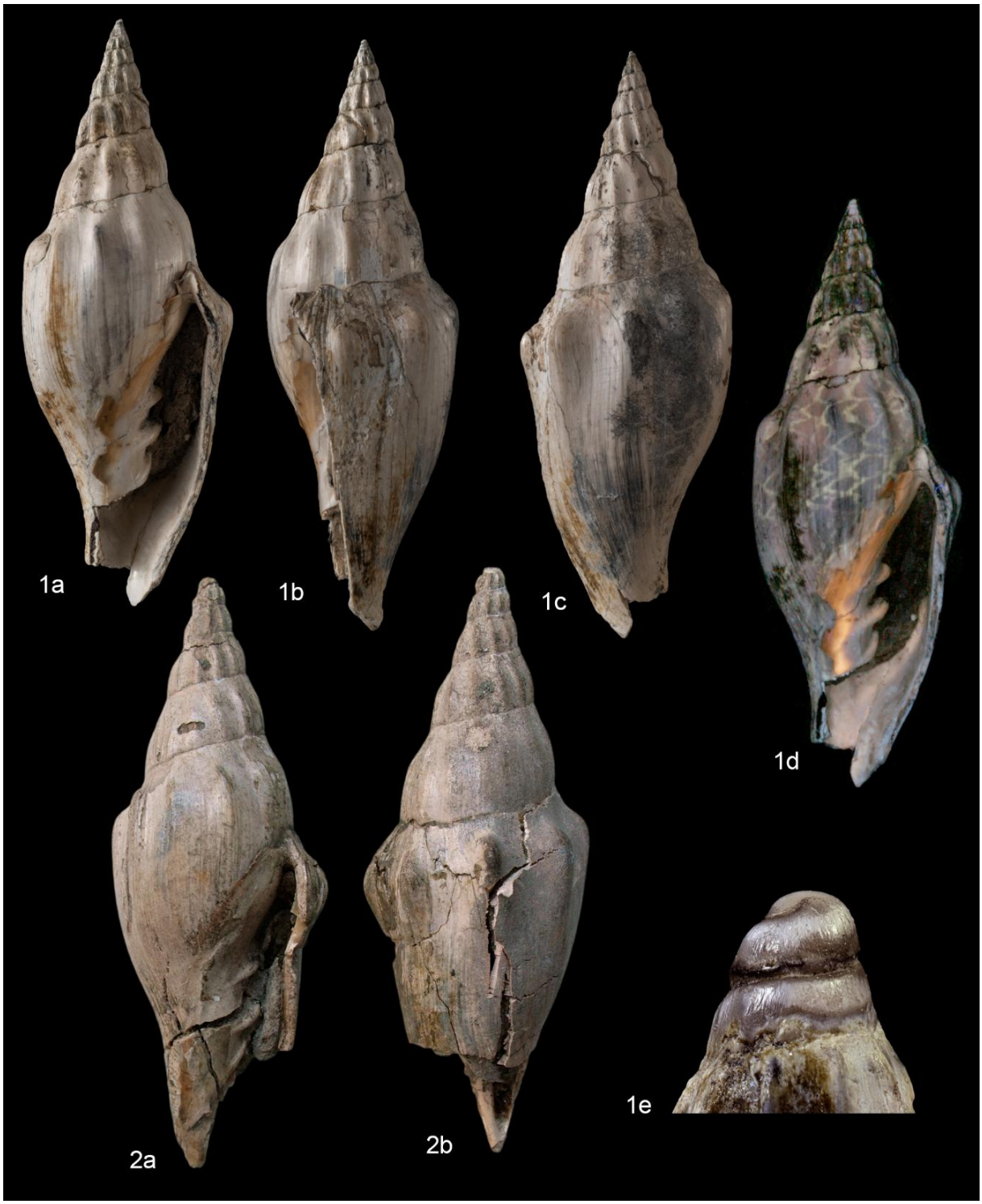

Plate 2. ***Alcithopsis insperata*** **sp. nov. from Ypresian of France, Pyrénées-Atlantiques, Gan, La Tuilerie.** Fig. 1. Holotype MNHN.F.J12672 (O'Gorman coll.), H 64.0 mm, in natural light (1a-c), under UV light (1d) with residual color pattern and protoconch (1e). Fig. 2. Paratype UBT 29.2.131 (O'Gorman coll.) in natural light, H 67.6 mm. Credits P. Loubry (fig. 1a-d) and L. Cazes (fig. 1e).

nodular at rear and creating slightly concave adapical ramp. Fine obsolete spiral cords on penultimate whorl. Last whorl 62% of total height, broad in its posterior part, smooth, constricted at neck, with numerous fine growth lines. Aperture narrow, parietal and columellar edges covered by fine inductura. Siphonal canals not preserved. Three visible strong columellar folds (probably four present). Two most apical folds parallel, next one being weaker and more oblique. Outer lip thick, orthocline, smooth inside. Residual color pattern consisting of very fine imbricated zigzag stripes, fluorescent under UV light.

Comparison. – *Alcithopsis insperata* sp. nov. differs from *Volutilithes deshayesianus* (Rouault, 1850) in its thicker shell and lacks the numerous spiral threads covering the entire surface of Rouault's species. Its whorls are lower and less vertical, sutural ridge is less pronounced, columellar edge is less concave, aperture is significantly narrower, and the columellar folds are fewer, much stronger and thicker. Above all, the residual color pattern is very different.

CONCLUSION

This revision of Gan's Volutilithinae demonstrates the importance of studying residual color patterns observed under UV light in fossils that are thought to have had a color pattern based on their present-day counterparts. Earlier authors, who did not have access to this technique or to the more abundant material collected recently, encountered many difficulties in identifying these species.

ACKNOWLEDGEMENTS

Philippe Loubry (MNHN/CNRS) and Lilian Cazes (MNHN/CNRS) took the photos and did the infography of the plates. Alexandre Lethiers (SU) did the infography of Fig. 1. We would like to thank also Laurent Londeix (University of Bordeaux 1) for the information on the material housed at the University of Bordeaux 1. The initial manuscript benefited from constructive comments from reviewers Bernard Landau and Henk Dekker (both Naturalis Biodiversity Center, Leiden, The Netherlands).

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Comments on the generic attribution of the Oligocene species *Murex subfusifomis* d'Orbigny, 1852 (Gastropoda, Muricidae)

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ABSTRACT

***Murex subfusiformis* d'Orbigny, 1852 is a poorly understood species that has been attributed to several genera in the past. Based on examination of the holotype, identifications of this species outside its type-locality are examined, and previous generic attributions are revised. It turns out that: 1) identifications of the species outside its type locality correspond to other species and 2) the previous generic attributions are based on comparisons with extant taxa and should be rejected. *Murex subfusiformis* belongs to a group of fossil Muricidae and particularly the genus *Pseudotrophonopsis* Merle, 2024. It is the second known species of this genus.**

Key words – Muricidae, systematics, palaeontology, Cenozoic, Belgium

INTRODUCTION

D'Orbigny (1852) introduced *Murex subfusiformis* as a replacement name for *Murex fusiformis* Nyst, 1845, as this name was already used previously by Gmelin (1791), Von Salis-Marschlins (1793), Bosc (1801), Anton (1838) and Münster (1844). This species has been rather uncritically assigned to several different genera without properly taking its shell characteristics into account. A new examination of the holotype allows for a more appropriate generic attribution.

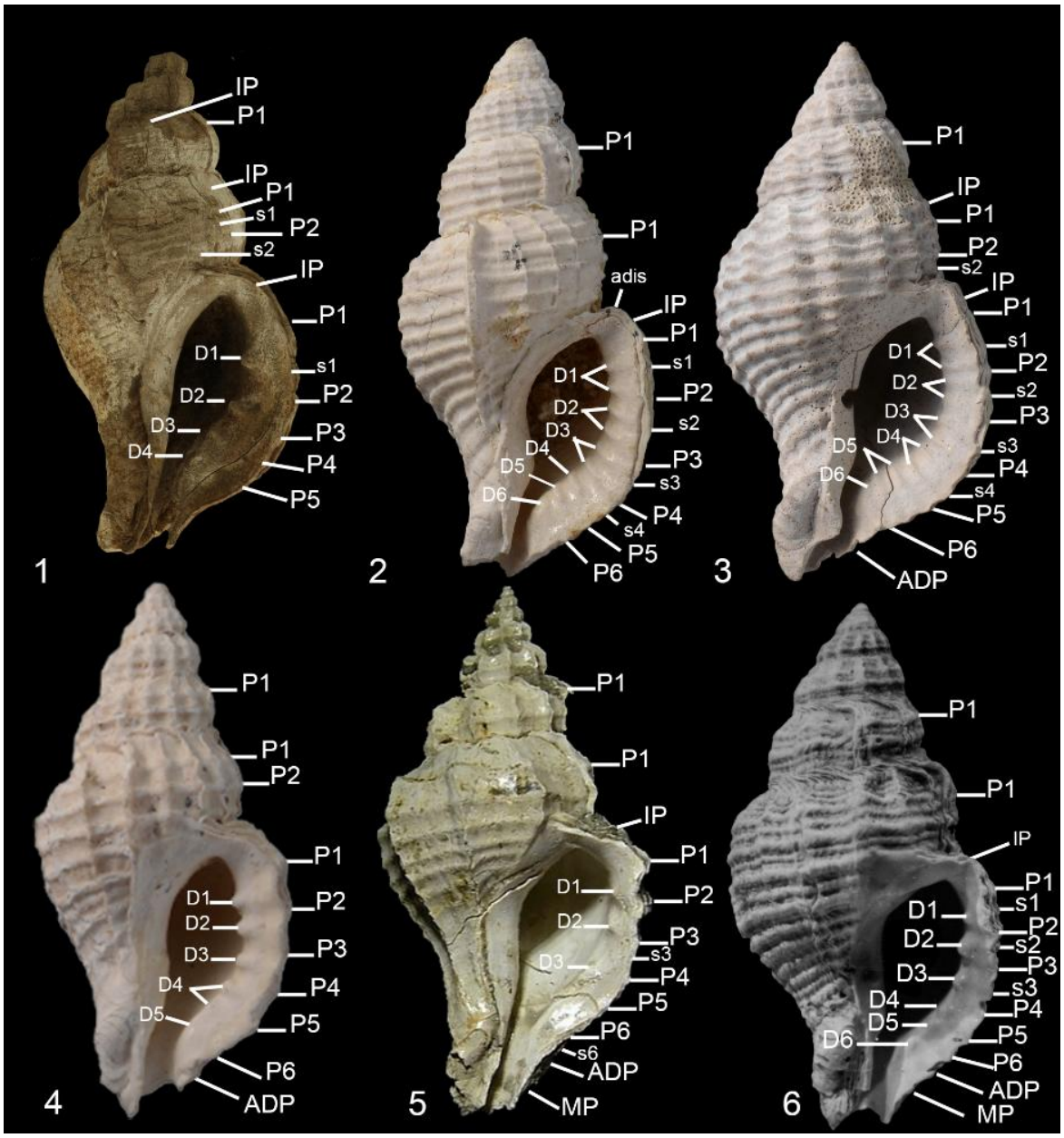

Plate 1: Terminology of the spiral cords and the internal denticles of the outer lip of *Pseudotrophonopsis subfusiformis* (A. d'Orbigny, 1852), compared with other closely related Muricidae. Fig. 1. ***P. subfusiformis***, Belgium, Vliermaal, Rupelian, H 31 mm, holotype, IRSNB3860. Fig. 2. ***P. defossa*** (Pilkington, 1801), France, Le Vouast, Priabonian, H 22.7 mm, MNHN.F.A90160. Fig. 3. ***P. defossa*** (Pilkington, 1801), U.K., Barton-on-Sea, Bartonian, H 26 mm, MNHN.F.J17634. Fig. 4. ***Beyregrex pereger*** (Beyrich, 1854), France, Auvers-saint-Georges, Rupelian, H 19.7 mm, MNHN.F.90561. Fig. 5. ***B. hantoniensis*** (Edwards, 1866), U.K., Whitecliff bay, White Island, Priabonian, H 23 mm, Morton coll. Fig. 6. ***Jsowerbya sexdentata*** (J. de C. Sowerby, 1823), U.K., Colwell Bay, White Island, Priabonian, H 15 mm, BMNH GG22673.
Credits: Fig. 1, Colin Debonnet and Julien Lalanne (IRSNB); Figs 2-4, P. Loubry (MNHN/CNRS); Fig. 5, A. Morton (White Island, U.K.); Fig. 6. D. Serrette (MNHN).

TERMINOLOGY

The description of the new taxa and the comparisons adopt the terminology suggested by Merle (2001, 2005a).

IP: infrasutural primary cord
P1: shoulder cord
P2-P6: primary cords of the convex part of the teleoconch whorl
ADP: adapertural primary cord on the siphonal canal
MP: median primary cord on the siphonal canal
ABP: abapertural primary cord on the siphonal canal
s1-s6: secondary cords of the convex part of the teleoconch whorl (example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.)
ID: infrasutural denticle of the outer lip
D1-D6: abapical denticles of the outer lip

Abbreviations

BMNH Natural History Museum, London, England
IRSNB Royal Belgian Institute of Natural Sciences, Bruxelles, Belgium
MNHN Muséum national d'Histoire naturelle, Paris, France
MNHN.F collection de Paléontologie
NHMM Geology & Palaeontology Collections, Natuurhistorisch Museum Maastricht, Netherlands
D diameter of shell
H height of shell

TAXONOMY

Superfamily Muricoidea Rafinesque, 1815
Family Muricidae Rafinesque, 1815
Subfamily *Incertae sedis*

Genus ***Pseudotrophonopsis*** Merle *in* Merle, Pacaud, Ledon & Goret, 2024

Type species: *Buccinum defossum* Pilkington, 1804, by original designation
Origin: Bartonian, Hampshire (U.K.) to Priabonian, Paris Basin (France).

Pseudotrophonopsis subfusiformis (d'Orbigny, 1852) (new combination)

(Fig. 1, Pl. 1 Fig. 1)

Murex fusiformis Nyst, 1845: 546-547, pl. 42 fig. 13a-b [non Gmelin, 1791, nec Von Salis-Marschlins, 1793, nec Bosc, 1801, nec Anton, 1838, nec Münster in Goldfuss, 1844].
Murex subfusiformis d'Orbigny, 1852: 15, n° 224a [nomen novum].

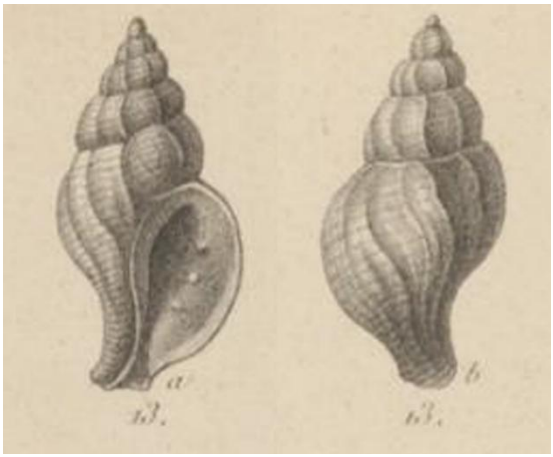

Figure 1. Original figure of *Murex fusiformis* Nyst, 1845, pl. 42 fig. 13a-b. Left: ventral face; right: dorsal face. H 31 mm.

Other references
Murex fusiformis Nyst – Rutot, 1877: 51, pl. 3 fig. 5a-b.
Murex fusiformis Nyst – Vincent, 1887: 5, n° 9.
Murex fusiformis Nyst – Cogels, 1887: 407.
Ocenebra (Ocenebrina) fusiformis (Nyst) – Cossmann, 1903: 39.
Aspella (Favartia) subfusiformis (d'Orbigny A.) – Glibert & Heinzelin de Braucourt, 1954: 366, pl. 6 fig. 20.
Muricidea subfusiformis (d'Orbigny A.) – Glibert, 1957: 64.
?*Odontopolys subfusiformis* – Vokes, 1971: 103.

non Murex fusiformis Nyst – von Koenen, 1889: 69-71, n° 15, pl. 3 fig. 8a-b.
non Favartia subfusiformis (d'Orbigny A.) – Marquet et al., 2016: 43-44, pl. 11 fig. 4 [= *Beyregrex pereger* (Beyrich, 1854)]

For the correct dates of the Mémoires de la Société royale malacologique de Belgique, we refer to the work of Breure & Backhuys (2021).

Type locality. – Belgium, Limbourg, Kortessem, Vliermaal.

Type horizon. – Oligocene, Rupelian, Kleine Spouwen Clay Member.

Type material. – Holotype IRSNB 3860 (Nyst coll.).

Description. – **Revised description based on the holotype.** Biconic bucciniform teleoconch composed of four visible whorls (probably eight according Nyst (1845). Moderately high spire with rounded whorls. Last whorl up to 77% of total length. Apical angle 53°. Spiral sculpture with marked primary cords. Antepenultimate and penultimate whorls: IP, P1, s1, P2, s2. Last whorl: IP (weak), P1 to P2, s1 to s2 and abapically 15 poorly distinguishable subequal cords including at least P3 to P6, ADP and MP and secondary cords. On spire eight varices, on last whorl ten varices (fide Nyst, 1845: 547]. Varices lamellose, low, not spiny,

slightly flexuous near adapical suture. Suboval aperture up to 47% of diameter and up to 65% of length of last whorl (including siphonal canal). Columella slightly angular. Columellar lip narrow, slightly erect, with one tubercle. Parietal lip adherent. Posterior anal notch shallow. Outer lip flared with four strong denticles including D1 to D4. D1 stronger than other denticles. Siphonal canal, short, open, up to 33% of aperture length. Pseudo-umbilicus narrow.

Measurements. – Holotype, H 31 mm, D 16 mm.

Discussion. – Specimens previously attributed to *Murex subfusiformis* d'Orbigny, 1852 - Koenen (1889, pl. 3 fig. 8a-b) illustrated as *Murex fusiformis* Nyst, 1845 a specimen from the uppermost Eocene, Priabonian, of Germany (Lattorf) bearing a narrow shape, numerous cords below a poorly developed shoulder and strong D1-D2. Its spire seems display only P1 and P2. It differs from the holotype of *M. subfusiformis* by having a narrower shape, subcarinate whorls, a narrower aperture, fewer denticles, and has only P1-P2 on the spire, whereas *M. subfusiformis* has more cords (IP, P1, s1, P2, s2). Given these numerous differences, it seems unlikely that this German specimen is conspecific with *M. subfusiformis*.

Marquet et al. (2016: pl. 11 fig. 4) illustrated another specimen (NHMM 2016 020) from the Lower Oligocene, Rupelian, of Belgium, Grimmertingen, that they attributed to *Aspella (Favartia) subfusiformis* (d'Orbigny, 1852). This specimen bears P1 and P2 on the spire and has subcarinate whorls. Its aperture is not completely formed and lacks denticles. It strongly resembles juveniles of *Beyregrex pereger* (Beyrich, 1854), a muricid which is very common in the north European Rupelian.
Although these two mentioned Muricidae are not conspecific with *Murex subfusiformis*, their shells are reminiscent of those of a group of basal Muricidae including *Beyregrex* Merle in Merle et al., 2024, *Jsowerbya* Merle, 2005b and *Pseudotrophonopsis*.

Previous generic assignments. – Until now, *Murex subfusiformis* has been attributed to no fewer than five different genera: *Ocenebra* Leach, 1847, *Aspella* Mörch, 1877, *Muricidea* Swainson, 1840, *Odontopolys* Gabb, 1860 and *Favartia* Jousseaume, 1880.
- *Ocenebra* (type species *Murex erinaceus* Linnaeus, 1758, by monotypy; subfamily Ocenebrinae Cossmann, 1903) includes species with a sealed siphonal canal, with poorly developed denticles and subcarinate whorls.
- *Aspella* (type species *Ranella anceps* Lamarck, 1822, by monotypy; subfamily Aspellinae Keen, 1971) contains highly differentiated bivaricate species.
- *Muricidea* Swainson, 1840 (type species *Murex magellanicus* Gmelin, 1791, by original designation [= *Trophon geversianus* (Pallas, 1774]; subfamily Ocenebrinae) is a junior subjective synonym of *Trophon* Montfort, 1810. *Trophon* comprises South American temperate species that have a wider shape, calcitic shells and lack denticles within the outer lip.
- *Odontopolys* (type species: *Murex (Odontopolys) compsorhytis* Gabb, 1860, by original designation; subfamily *Incertae sedis*) slightly resembles *Murex subfusiformis* in its strong denticles D1 to D4. However, its last whorl is particular and displays a trivaricate sculpture with low intervarices lacking in *Murex subfusiformis*. Moreover, its siphonal canal is completely sealed. According to Garvie (1991: 90), in outline *O. compsorhytis* greatly resembles *Vitularia salebrosa* Vokes, 1967 from the Pliocene of Florida.

- *Favartia* (type species: *Murex breviculus* G. B. Sowerby II, 1834, by original designation; subfamily Aspellinae) is another very different genus characterized by strong spiral cords, poorly developed internal denticles and varices with strongly imbricated growth laminae.

New generic assignment. – *Murex subfusiformis* is reminiscent of European Paleogene Muricidae such as *Beyregrex*, *Jsowerbya* and *Pseudotrophonopsis*. In the phylogenetic tree of Merle *et al*. (2024: 499, fig. 1), they represent basal genera of Muricidae, called Informal group *Jsowerbya-Beyregrex-Pseudotrophonopsis* (see Pl. 1). They are characterized by lamellose varices, an open siphonal canal, developed denticles without ID, and an aperture with a posterior notch located above P1 or a notch located at the level of the P1 spine which is hollow. Number of internal denticles can vary between five (D1 to D5) or six (D1 to D6), when all denticles are present. *Beyregrex* Merle *in* Merle et al., 2024 (type species: *Murex pereger* Beyrich, 1854, by original designation; Rupelian, France, Belgium and Germany) differs by having a spiral sculpture bearing only P1-P2 on the spire and fewer secondary cords. It has a more or less developed notch of P1 spine, but not a posterior notch. *Jsowerbya* Merle, 2005b (type species: *Murex sexdentatus* J. de C. Sowerby, 1823, by original designation; Priabonian, England) bears a posterior notch, numerous cords (from IP to ADP) and strong denticles within the aperture (Merle, 2005b). However, species of this genus differs from *M. subfusiformis* by having only P1-P2 on the early whorls and D2 is the strongest denticle (not D1 which is atrophied). Internal denticles are fewer and stronger in *Murex subfusiformis* than in *Pseudotrophonopsis defossa* (Pilkington, 1804), but in both species D1 is the strongest denticle. *Murex subfusiformis* has, as in *P. defossa*, a sculpture with numerous cords on the spire (IP, P1-P2 and s1-s2), rounded whorls with a buccinid shape and a posterior notch. These similarities justify a genus attribution to *Pseudotrophonopsis*. *Pseudotrophonopsis subfusiformis* is the second known species of this genus.

CONCLUSION

The attribution of *Murex subfusiformis* d'Orbigny, 1852 to *Pseudotrophonopsis* places this species within a group of basal Muricidae, which diversified during the Paleogene (Merle et al., 2024). *Pseudotrophonopsis subfusiformis* is the second species of this genus. *Pseudotrophonopsis defossa* is known only from the Eocene, Bartonian to Priabonian. With *P. subufusiformis*, the known stratigraphic distribution of *Pseudotrophonopsis* now extends to the Oligocene, Rupelian.

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What are you doing there? A range extension for *Enixotrophon latus* (B. A. Marshall & Houart, 2011) (Gastropoda, Muricidae)

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ABSTRACT

***Enixotrophon* Iredale, 1929 is a genus which has hitherto been restricted to the deep waters of the southwestern Pacific. This paper extends the range of this genus into the Arafura Sea, north of Darwin, and from shallower water than previously recorded. *Enixotrophon lata* (Marshall & Houart, 2011) has been restricted to the southeastern coast of Australia and New Zealand. The material was sourced directly from the fisherman and the locality data, while details are unknown, remains regionally sound.**

Key words – Muricidae, Pagodulinae, *Enixotrophon*, Australia, Arafura Sea, new records

INTRODUCTION

The Arafura Seas, north of Darwin, Australia, have been understudied in terms of their molluscan diversity. However, more recent studies have sought to revisit material from this region, this has led to the expansion of ranges and bringing to light of rare material (Clark et al., 2026).

There are currently 47 species in the genus *Enixotrophon* Iredale, 1929 and all are restricted to the southwestern Pacific deep waters. There have been a number of major revisions of the species complex using a variety of taxonomic methods, shell morphology, anatomy, molecular data, which have led to improved clarity at the species level, while resolving the higher taxonomy robustly (Marshall & Houart, 2011; Barco et al., 2015; Marshall & Houart, 1995; Houart, 2023). This paper expands the known range of *Enixotrophon* into an area thought to be both too shallow and too geographically isolated from the known distribution of the other species in the genus.

Abbreviations

DSC	Drew Strickland Collection, Geraldton, Western Australia, Australia.
L	shell length

METHODS

New material was obtained from scampi trawlermen in the Arafura Sea to the northwest of Darwin, and the material and location data was supplied by those trawlermen known to Drew Strickland. The shells were compared with the holotype illustration of *Enixotrophon latus* (Marshall & Houart, 2011), and conformation of identification was supplied by Roland Houart, Landen, Belgium. The material and propensity to undertake genetic testing of the species hypothesis was in place, the financial resources were sadly not.

TAXONOMY

Family Muricidae Rafinesque, 1815
Subfamily Pagodulinae Barco, Schiaparelli, Houart & Oliverio, 2012
Genus *Enixotrophon* Iredale, 1929

Type species *Trophon carduelis* R. B. Watson, 1882 by original designation

Enixotrophon latus (B. A. Marshall & Houart, 2011)

(Pl. 1 Figs A-E)

Synonymy:
Trophon cf. *coulmanensis* – Gardner 1978: 102, text fig. [not E. A. Smith, 1907].
Trophon carduelis – Cochran, 1985: 9, text fig. 1883 [not Watson, 1882].
Enixotrophon carduelis – Wilson, 1994: 51, pl. 6 fig. 1A-B [not Watson, 1882].
Pagodula carduelis – Marshall & Houart, 1995: 27 [not Watson, 1882].
Pagodula lata Marshall & Houart, 2011: 100.

Original Description. – "Shell large for genus, up to 54.2 mm in length at maturity, broad, heavy, lamellose, ivory or creamy-white; spire broadly to narrowly conical, spire height 40.1–48.2% (est.) of shell height. Protoconch of 1.8 smooth, convex whorls, 900 µm wide; first half whorl 520 µm wide; terminal varix opisthocyrt, gently opisthocline. Teleoconch of up to 8.2

(est.) broad, convex whorls, strongly shouldered at about adapical third; sutural ramp gently sloping, more or less flat; sculptured with high, narrow, forward-sloping, commarginal lamellae, strongest as short or moderately long, spine-like projections at shoulder angulation: 9 axial lamellae on first whorl, 8–10 on second and third, 8–9 on fourth, 7–10 on fifth, 8–10 on sixth, 8–11 on seventh and 9–10 on last whorl. Primary spiral sculpture obsolete, position of P1 defined by shoulder angulation. Secondary axial sculpture consisting of commarginal growth lines and fine spiral striae. Aperture large, porcellanous [sic] white, roundly ovate; columellar lip narrow, smooth, rim completely adherent; posterior notch shallow, broad; outer lip smooth. Siphonal canal moderately short, 35–37% of total shell length, broad, weakly twisted, dorsally recurved, broadly open, with low axial lamellae over whole length" (Marshall & Houart, 2011: 101).

Supplemental diagnosis. – The new well-worn specimens range in length from 44.1 to 52.4 mm; upper whorls are missing; teleoconch strongly shouldered and rounded with nine distinctive well-spaced solid knobs, with little evidence of lamellae; aperture large, porcelaneous white, roundly ovate; columellar callous narrow; body whorl inflated; when intact, siphonal canal is equal in length of the aperture, narrow and is slightly reflected.

Type locality. – New Zealand, off Cape Kidnappers, 900 m (Marshall & Houart, 2011).

Material examined. – Australia, off Darwin in the Arafura Sea, 250-300 m: A) L 52.4 mm (DSC, Pl. 1 Fig. A); B) L 44.1 mm (DSC, Pl. 1 Fig. B).

Comparison and remarks. – The new material lacks the foliations typical of the species *Enixotrophon latus*, this is attributed to the wear of the shells. Notwithstanding, the new material appears to differ in having more pronounced and solid knobs and a slightly different form of siphonal canal than those from the southern regions of Australia and New Zealand. However, without high quality material available that does not have undergone wear, including possessing the upper teleoconch and protoconch, the authors adhere to the identification of Roland Houart, the primary researcher of this species complex.

The Arafura material falls well outside the previously known range and ecosystems, inhabits shallower water, 250-300 m, rather than the depth of 1000 m or more known for this species (Marshall & Houart, 2011). It is the first Australian record of this species outside southwestern and southern Australia and New Zealand. Given the distance and geographical barriers between the populations that contained the type and the new location, it is reasonable to hypothesize that there would have been a significant genetic difference between them if tested, and in time, such testing may lead to the erection of a new (sub-)species.

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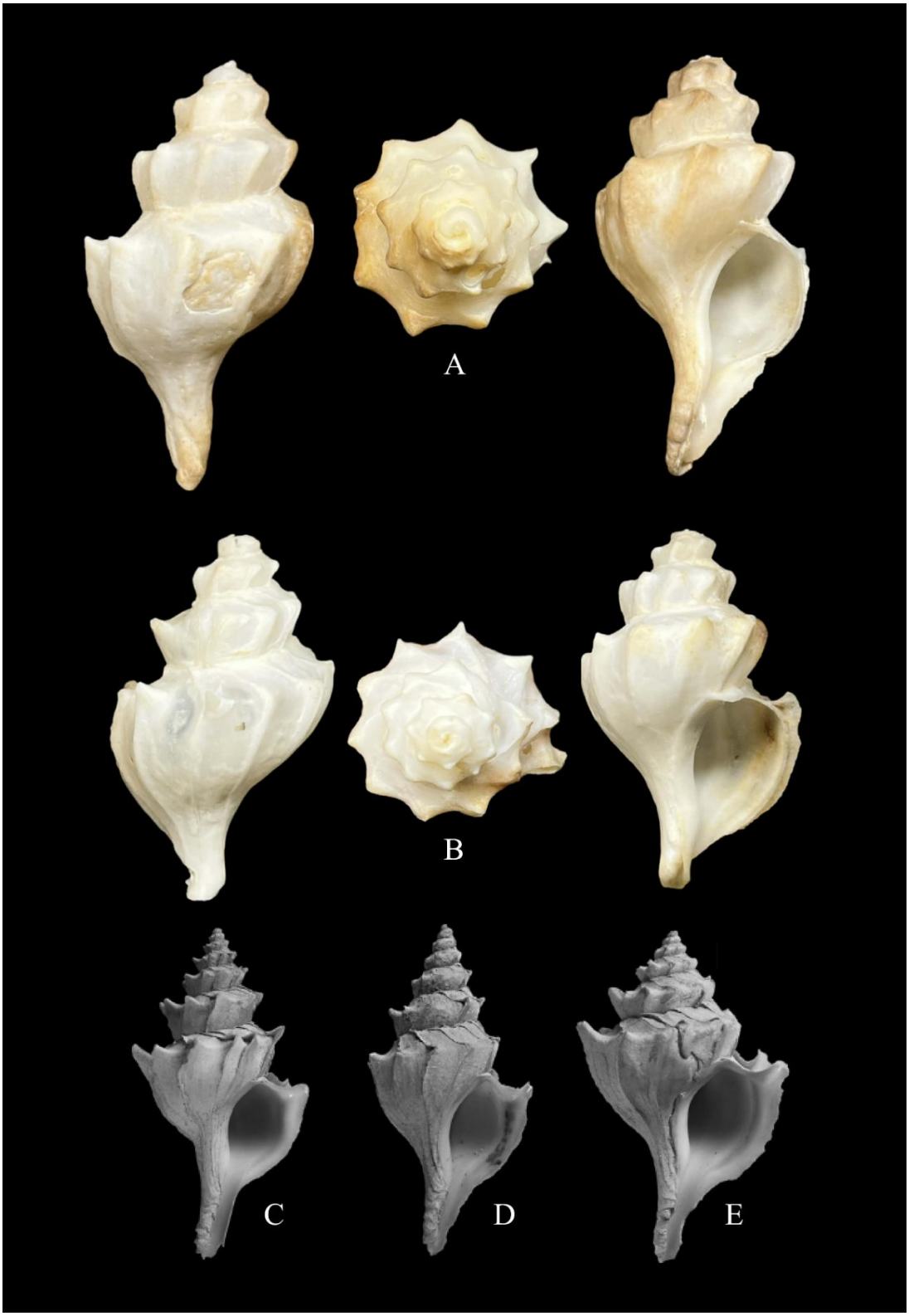

Plate 1. ***Enixotrophon latus*** **(B. A. Marshall & Houart, 2011).** A-B. Off Darwin in the Arafura Sea, 250-300 m. A. L 52.4 mm (DSC). B. L 44.1 mm (DSC). C, E. New Zealand, off Cape Kidnappers, 900 m. C. Holotype, L 52.7 mm (M.118123, Marshall & Houart, 2011: fig. 5i). E. Paratype (M.152783, Marshall & Houart, 2011: fig. 5k). D. New Zealand, Challenger Plateau, 1211–1216 m (M.284124, Marshall & Houart, 2011: fig. 5j).

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A new species of *Semicassis* Mörch, 1852 (Gastropoda, Cassidae) from Western Australia

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ABSTRACT

This paper names a new *Semicassis* Mörch, 1852 species from deep water in Western Australia, off Barrow Island. *Semicassis stricklandi* sp. nov. is a small species for the genus, closely resembling *S. diuturna* Iredale, 1927, but differs from that larger species in being more dorso-ventrally compressed and having a sculpture of fine beaded spiral threads. *Semicassis stricklandi* sp. nov. differs from *S. thachi* Kreipl, Alf & Eggeling, 2006 in having a less incised suture, a lack of varices on early whorls, and rows of spiral threads that anteriorly increase in size.

Key words – Barrow Island, Remotely Operated Vehicles, *Semicassis*, *Semicassis stricklandi* sp. nov., taxonomy

INTRODUCTION

The deeper waters of Western Australia are proving to be a gold mine for molluscan taxonomic research, with many new species being described recently (Zheng & Maxwell, 2026a, b, c; Zheng et al., 2026a). Much of this material has been collected using remotely operated vehicles (ROVs) which allow for selective specimen capture without ecological disturbance. Material is coming from areas that previously have not been explored in terms of molluscan diversity, primarily because of the substrates being unsuitable for commercial fisheries. Taxonomic work on this material depends on the generosity of individuals willing to assume the personal risks and financial costs of operating and maintaining the necessary equipment. Without this support, the present paper would not have been possible. The

collection of the type material of *S. stricklandi* sp. nov. by ROV highlights the important role of self-funded citizen scientists in discovering new deep-water species. Their efforts, and their willingness to share material without charge, underscore the need for continued substantive discovery work on deep-water marine Mollusca, an area currently neglected by Australian research institutions.

A *Semicassis* species was collected which was not found in the recent literature, e.g. the overview given of the Cassidae by Verbinnen et al., 2016. The apparently undescribed species from Western Australia is being described as a distinctive member of *Semicassis* Mörch, 1852, a genus with 57 accepted fossil and recent species (MolluscaBase, 30 April 2026). The most similar species is *Semicassis diuturna* Iredale, 1927. This species provides the basis for comparison. Although the columella of the new species illustrates the variability found within the genus and underscores the caution needed when describing new taxa, the species described here has clear morphological characters that distinguish it.

Abbreviations

BSRF BlueSky Research Foundation Collection, Cairns, Queensland.
DSC Drew Strickland Collection, Geraldton, Western Australia.
YZC Yao Zheng Collection, Perth, Western Australia.
L Length of the shell.

METHODS

This study uses shell morphology to describe a new species. Genetic material (the shell) to test species hypotheses was available for this study, but the cost of undertaking that task was outside the funding scope of the authors.

TAXONOMY

Superfamily Tonnoidea Suter, 1913 (1825)
Family Cassidae Latreille, 1825
Subfamily Phaliinae Beu, 1981

Genus *Semicassis* Mörch, 1852
Type species *Cassis japonica* Reeve, 1848 by subsequent designation Harris, 1897: 198

***Semicassis stricklandi* sp. nov.**

(Pl. 1, Pl. 2 Fig. A, Pl. 3 Figs A-F)

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Description. – Shell small, maximum size 38.1 mm, ovate, solid, with slight dorso-ventral compression. Protoconch smooth, acute, white and glossy. Teleoconch whorls convex with broad varices on penultimate whorl, with fine beaded spiral threads that form steps, sutures incised. Body whorl rounded, widest mid-whorl, covered with fine spiral scaled threads with the last three larger than those on the body whorl, these threads stop before the formation of

the outer lip. A single broad ventral varix with sharp edge forming a canal sculptured with spiral threads, shoulder indistinct. Posterior columella forming a clear rounded shield that extends out to midbody and down to base of aperture, columella strongly concave centrally, forming plaits anteriorly post inflection. Outer lip spirally thickened, sculptured with threads joining below the suture, with reflected dorsal margin forming a semi enclosed canal with the body whorl, anterior sinus shallow. Labrum wide, increasing in width toward the anterior where it ends abruptly well below the body whorl, and with distinctive teeth which slightly protrude into and extend down into the aperture. Siphonal canal thin and well formed, strongly reflected axially, one side forming under the columella and is rounded, smooth and undulated; siphonal lobe short and sharp formed by the extension and reflection of outer lip. Anterior umbilical sinus deep and open. Shell color white with tan-yellow dorsal staining.

Holotype. – Western Australia, south of Barrow Island, ROV collected on sand bank, 90-110 m deep, L 38.1 mm (BSRF0043; Pl 3A).

Paratypes. – Paratypes 1-5. Type locality. 1. L 28.9 mm (DSC, Pl. 2 Fig. A). 2. L 24.1 mm (DSC, Pl. 1). 3. L 25.9 mm (YZC, Pl. 3 Fig. B). 4. L 22.6 mm (DSC, Pl. 3 Fig. C). 5. L 22.1 mm (DSC, Pl. 3 Fig. D); **Paratypes 6-7.** Western Australia, Bank west of Thevenard Island, 120-140 m, ROV collected. 6. L 25 mm (DSC, Pl. 3 Fig. E). 7. L 25.1 mm (DSC, Pl. 3 Fig. F).

Type locality. – Western Australia, south of Barrow Island, on sand, 90-110 m deep.

Etymology. – Named in honour of Drew Strickland, who has donated the material to the authors, for the enablement of a more nuanced understanding of Western Australian Mollusca, and for his long-term commitment and contribution to research

Comparison. – *Semicassis stricklandi* sp. nov. is most similar to *S. diuturna* (Pl. 2 Fig. B) but is much smaller and dorso-ventrally compressed. *Semicassis diuturna* (Pl. 2 Fig. B) has a rounded shell with fine incised spiral lines and wide interspaces, *S. stricklandi* sp. nov. has close, fine, raised spiral threads that are beaded. *Semicassis diuturna* has 23 fine labial teeth that fade anteriorly compared to the more pronounced 17-20 teeth of *S. stricklandi* sp. nov. The faint pattern of spirally arranged color blocks of the Broome *S. diuturna* is not shared with *S. stricklandi*. The disordered raised lirae on the columella of *S. diuturna* differs from the strongly formed plaits of the holotype of *S. stricklandi* sp. nov. and the finer lirae of paratype 1. This variability of the columella sculpture makes it a problematic taxonomic identifying character for *S. stricklandi* sp. nov. Both *S. stricklandi* sp. nov. and *S. diuturna* share a deep open umbilicus when viewed laterally.

While similar to *Semicassis stricklandi* sp. nov. in size and general shape, *S. thachi* Kreipl, Alf and Eggeling 2006 (Pl. 2 Fig. C) differs in having several varices consistently on early whorls, rarely found in *S. stricklandi* sp. nov., has a more canaliculated suture. *S. thachi* has defined spiral sculpture that remains constant extending onto the labrum, but which fade in *S. stricklandi* sp. nov. In *S. thachi* the final anterior spiral threads do not increase in size, unlike the last three in *S. stricklandi* sp. nov. The latter shares broad similarities with the East African highly localised endemics *S. bondarevi* Mühlhäusser and Parth, 1993 (Pl. 2 Fig. D) and *S. dorae* (Kreipl and Mühlhäusser, 1996) (Pl. 2 Fig. E) but both these species lack the fine beaded sculpture of *S. stricklandi* sp. nov.

Plate 1. *Semicassis stricklandi* sp. nov. Paratype 2, Western Australia, south of Barrow Island, on sand bank, 90-110 m deep, ROV collected, L 24.1 mm (DSC).

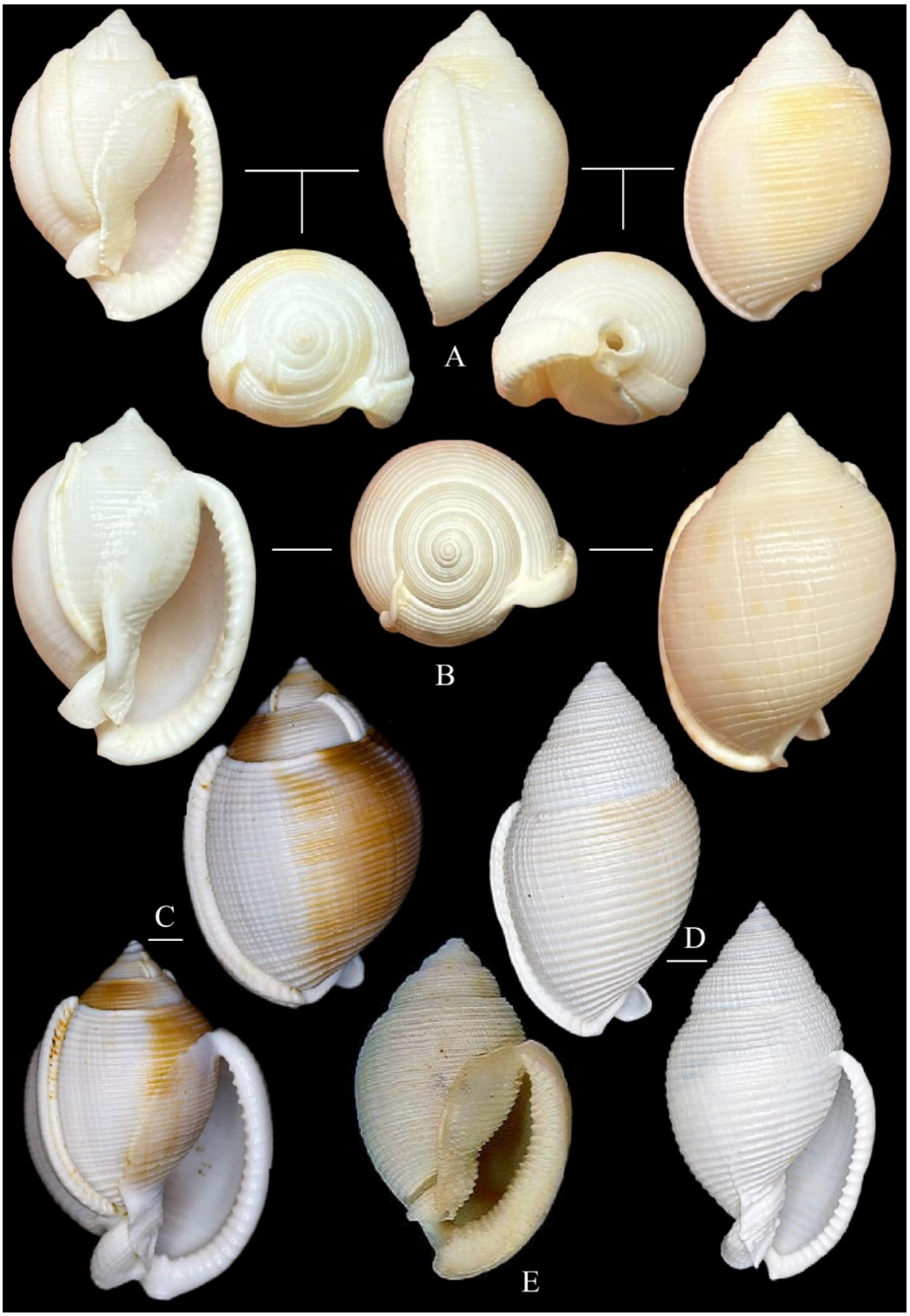

Plate 2. Comparative plate of *Semicassis* species. A. ***S. stricklandi* sp. nov.**, paratype 1, Western Australia, south of Barrow Island, on sand bank, 90-110 m deep, ROV collected, L 28.9 mm (DSC). B. ***S. diuturna*** (Schubert & Wagner, 1829), Western Australia, north of Broome, 30-40 m, trawled, L 37.2 mm (YZC). C. ***S. thachi*** Kreipl, Alf and Eggeling 2006, *Vietnam,* off Nha Trang, 18-20 m, trawled, 36.5 mm (Femorale no. 337022). D. ***S. bondarevi*** Mühlhäusser and Parth, 1993, Saya de Malha Bank, deep water, trawled, L 54.9 mm (Femorale No. 317819). E. ***S. dorae*** (Kreipl and Mühlhäusser, 1996), North Sri Lanka, L unknown (Conchology, Inc., no. 544581).

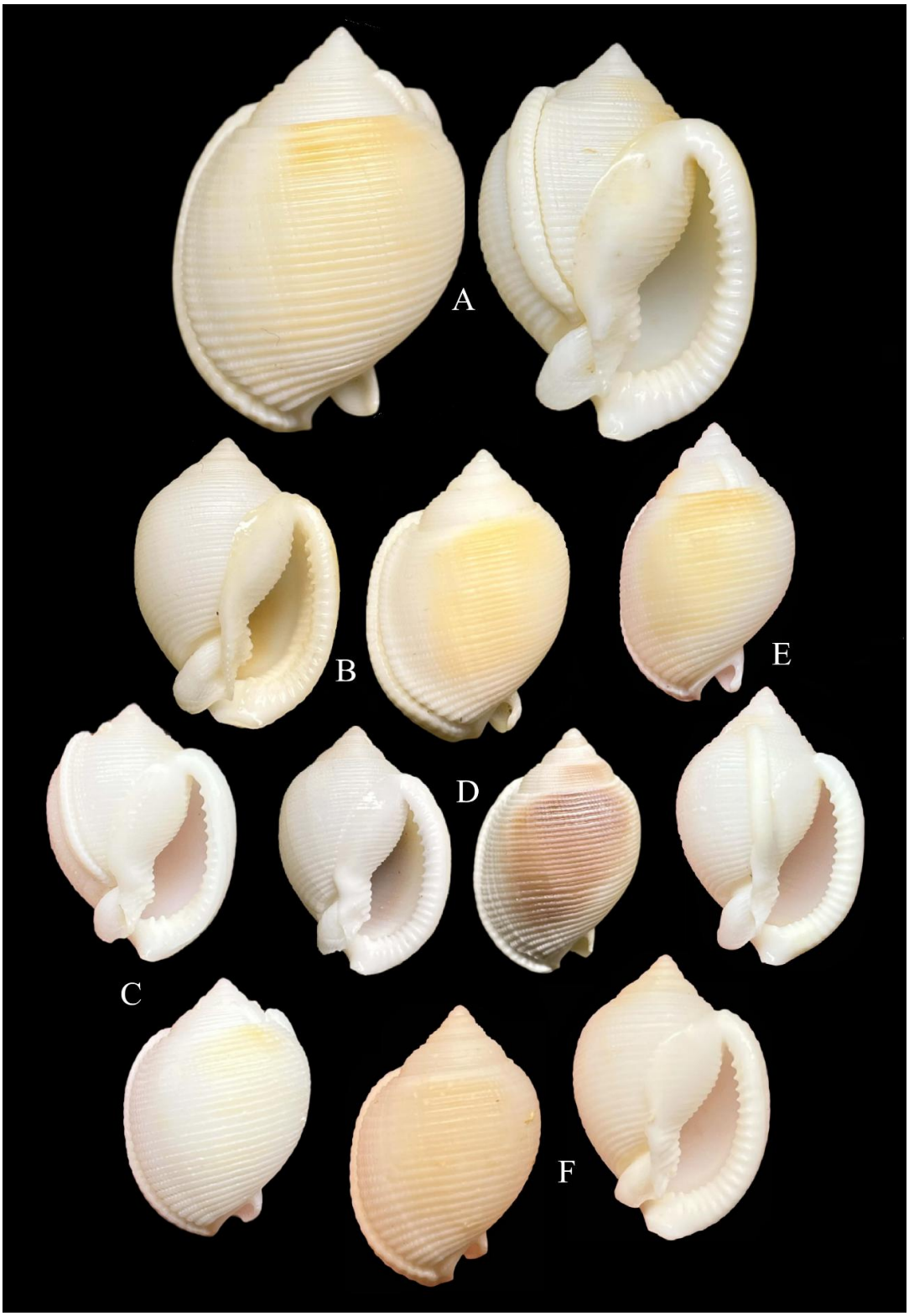

Plate 3. *Semicassis stricklandi* sp. nov. A-D. Western Australia, south of Barrow Island, on sand bank, 90-110 m deep, ROV collected. A. Holotype, 38.1 mm (BSRF0043). B. Paratype 3, L 25.9 mm (YZC). C. Paratype 4, L 22.6 mm (DSC). D. Paratype 5, L 22.1 mm (DSC). E-F. Western Australia, bank west of Thevenard Island, 120-140 m, ROV collected. E. Paratype 6, L 25 (DSC). F. Paratype 7, L 25.1 mm (DSC).

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Illustration of *Trochus solaris* Linnaeus, 1764 (Gastropoda, Xenophoridae) and designation of a lectotype

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ABSTRACT

Linnaeus (1758, 1764) did not illustrate his described Mollusca species. Also, *Trochus solaris* Linnaeus, 1764, type species of *Stellaria* Möller, 1832, was not illustrated in his work. Linnaeus originally referred to two drawings in older books with illustrations of the species and to a shell he donated to the collection of the Queen. The shell of *Trochus solaris* donated by Linnaeus is illustrated here for the first time; it is preserved at the Uppsala University and is herein designated as the lectotype to stabilise the identity of this name.

Key words – Xenophoridae, *Stellaria*, *Stellaria solaris*, subsequent type designation

INTRODUCTION

The taxonomical status of the species in the genus *Stellaria* Möller, 1832 was reviewed by Nappo et al. (2022). These authors introduced two new genera in the family: *Aspidophoreas* Nappo, Bini & Santucci, 2022 and *Ponderiana* Nappo, Bini & Santucci, 2022. Prior to their work, *Stellaria* included several living and fossil species which show considerable

morphological variation. The authors only retained *Trochus solaris* Linnaeus, 1764 and *Stellaria solaris paucispinosa* Kosuge & Nomoto, 1972 in *Stellaria*. Nappo et al. (2022) did not illustrate the shell of *Trochus solaris* Linnaeus, 1764 present in Uppsala, Sweden, nor did they mention that it was seen for their study.

TAXONOMY

Superfamily Stromboidea Rafinesque, 1815
Family Xenophoridae Troschel, 1852 (1840)

Genus *Stellaria* Möller, 1832

Type species *Trochus solaris* Linnaeus, 1764, type by monotypy

Synonymy:
Phoridae J. E. Gray, 1840: 119 (not Phoridae Curtis, 1833 [Diptera])
Onustidae H. Adams & A. Adams, 1854: 361

Diagnosis. – "Shells medium sized to large, rather depressed, brown in colour, with slightly convex whorls and convex base, widely umbilicate, with long and thin tubular digitations around the peripheral flange. Shell sculpture composed of numerous opisthocline granulated spiral cords, intersecting with faint growth lines. Basal sculpture composed of strong granulose colabral ribs, intersecting with spiral ribs close to the umbilicus. Attachments present only in the first two to four whorls. Smooth multispiral protoconch of around four whorls. Operculum thin, yellow, sides nearly straight, external surface smooth except for concentric growth lines and closely spaced radial striae" (Nappo et al., 2022).

Remarks. – Irwin et al. (2021) placed the family Xenophoridae in the superfamily Stromboidea, based on molecular research. The genus *Stellaria* is directly recognizable by the hollow, tubular, digitations perpendicularly attached to the peripheral flange. The shells of this genus have thin walls and are light in weight. The hollow, tubular digitations contribute to this light weight, instead of solid digitations or cemented foreign objects like in other genera of the family.

Included species. – Living species: *Stellaria solaris* (Linnaeus, 1764) and *Stellaria paucispinosa* Kosuge & Nomoto, 1972. The latter was originally described as subspecies (Kosuge & Nomoto, 1972), it was later considered as synonym by Ponder (1983: 53) and Kreipl & Alf (1999), although Mienis (1980; 2001) showed it to be a subspecies. Nappo et al. (2022: 6) raised it to full species, which status as valid species was confirmed through genetics by (Tan et al., 2026).

***Stellaria solaris* (Linnaeus, 1764)**

(Figs 1-4)

Trochus solaris Linnaeus, 1764: 645.
Astraea polaris Röding, 1798: 79.
Xenophora (*Stellaria*) *solaris* (Linnaeus, 1764) [in part] – Ponder, 1983: 50.
Stellaria solaris (Linnaeus, 1764) – Kreipl in Poppe, 2008: pl. 291 fig. 2a-c.
Stellaria solaris (Linnaeus, 1764) [in part] – Kreipl & Alf, 1999: 66, pl. 22 fig. 20, 20b.

Original description. – *Trochus umbilicata convexo-conica, anfractibus radiatis, dentibus tubulosis, apertura semicordata* (first part).
Linnaeus refers to:
Bonan. recr. 3. t. 366, 367. Male [= Buonanni, 1684; Male (Latin) = poor]
Rumph. mus. t. 20. f. K. [= Rumphius, 1705]

The original drawings in Buonanni (1684: figs 366-367) are reversed (mirrored), here they are represented in normal view (Fig. 1). Linnaeus (1764: 645) indicated that they are poor fit for his new species *solaris*. This is correct as the figures represent not this species, but the New Zealand Turbinidae species *Astraea heliotropium* (Martyn, 1784).

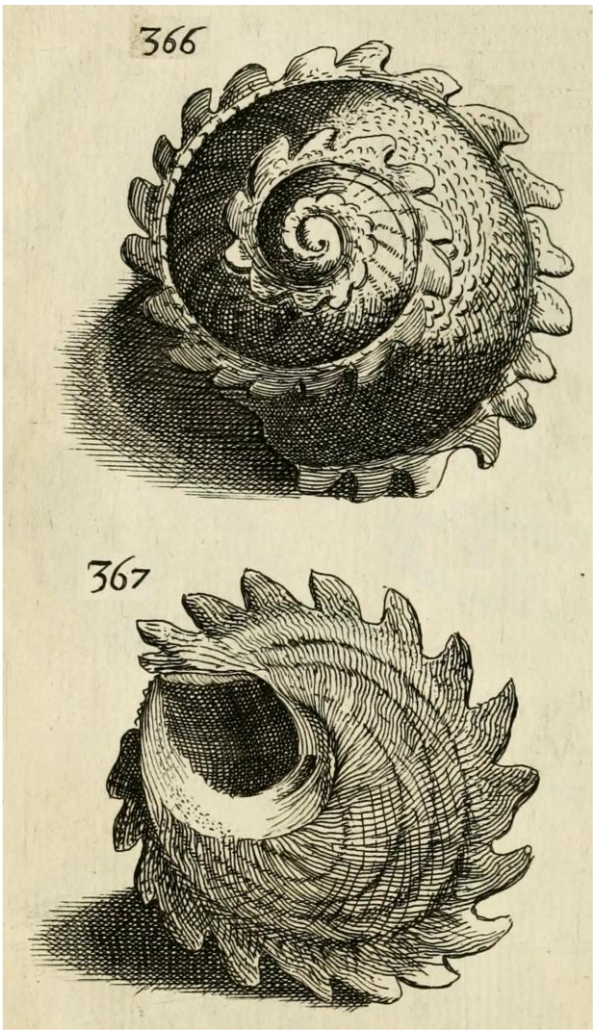

Fig. 1. Figs 366-367 from Buonanni, 1684. Mirrored from original figures. Regarded as a poor representation of his *Trochus solaris* by Linnaeus, 1764.
It represents the species *Astraea heliotropium* (Martyn, 1784) (Turbinidae) from New Zealand. This shell represents a paralectotype of *Trochus solaris* Linnaeus, 1758.

The drawing in Rumphius is also in reverse, but clearly recognizable as *S. solaris*: sharp peripheral spines and the characteristic oblique ridges on the upper side of the shell.

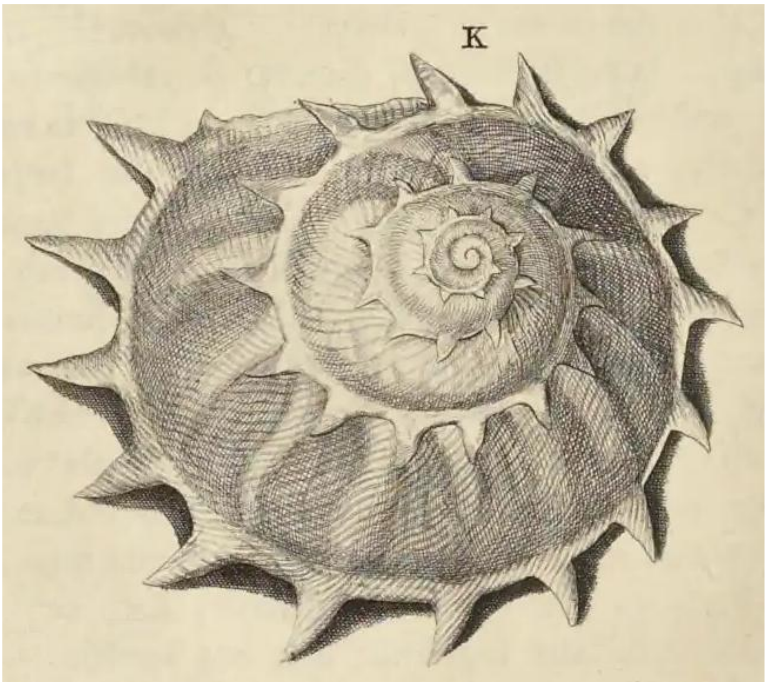

Fig. 2. Pl. 20 fig. K from Rumphius, 1705. Mirrored from original figure. This shell represents a paralectotype of *Trochus solaris* Linnaeus, 1758.

Types. – There are three syntypes of *Trochus solaris*. The figured shell by Buonanni (1684) (Fig. 1), the shell figured by Rumphius (1705) (Fig. 2) and the shell in the collection of the University of Uppsala (Odhner, 1953; Wallin, 2001) (Figs 3-4), see below. There is no type specimen in the Linnaean Society collection in London (Dodge, 1958: 188). As not all three syntypes represent the same species, a lectotype designation is needed.

Linnaeus (1758) did not mention this species, but only later it was described as new species by him in 1764. Linnaeus apparently gave the shell from his collection to Queen Louisa Ulrica, as is written in the original description: “Hanc rariffimam teftam e Mufeo proprio adjeci”, translated “I have added this extremely rare specimen from my own collection”. So probably Linnaeus obtained the shell after 1758, but before 1764 (Dodge, 1958: 188). The shell in possesion of the Queen was later donated to what is now the Uppsala University Zoological Museum by Gustav IV Adolf (Wallin, 2001: 100). This shell (Figs 3-4), in the Linnaeus collection nr. 717, is herein designated lectotype.

This shell was mentioned by Odhner (1953: 17, fig. 328) and by Wallin (2001: 100). Ponder (1983: 51) also noted this shell in the University of Uppsala collection and concluded that this specimen is the holotype. He mentiones “The two figures cited by Linnaeus (1764) therefore, have no type status". This clearly is an incorrect conclusion, as Linnaeus in his original description referred to both figures, so those figured shells belong also to the syntypes. Nappo et al. (2022: 2) apparently followed Ponder (1983) in incorrectly regarding the Uppsala specimen as the holotype. Ponder's (1983) action "This specimen is therefore, regarded as the holotype" cannot be considered as a lectotype designation by inference [ICZN art. 74.6], as it is clear from the original description that it was based on more than one specimen.

Type locality. – Linnaeus gives Java as type locality (Java, Indonesia).

Distribution. – Distributed in the Western Pacific, from Japan to eastern Thailand, the Philippines and Indonesia, in deep water.

Comparison. – This species is only comparable with *Stellaria paucispinosa* Kosuge & Nomoto, 1972 from the Indian ocean. *Stellaria paucispinosa* differs from *S. solaris* in the following features: The oblique cords on the upper surface are very strongly developed, corrugated and fewer in number; the colabrial cords at the base bear tubercles at the intersection with spiral ribs; the surface is ornamented with shell fragments from the initial whorl to the ante-penultimate or the penultimate whorl (only at the early whorls in *S. solaris*). The number of spinose projections around the periphery are fewer, in *S. paucispinosa* 10–13 (Kosuge & Nomoto, 1972), in *S. solaris* 14–20. *S. paucispinosa* is usually of smaller size (type material 46.7–93.0 mm). Specimens of *S. solaris* from the South China Sea (Vietnam) are usually much larger (to over 130 mm) than from Indonesia (usually 80-90 mm). Also, the color is different, *S. paucispinosa* is darker, light brown, often with 1-3 darker brown spirals on the upper half of the whorls, whereas S. solaris is light cream to yellowish-cream colored, with the colored spirals mostly lacking.

Fig 3. *Stellaria solaris* (Linnaeus, 1758). Lectotype herein designated, collection Uppsala University, Linnaeus collection nr. 717.

Fig. 4. *Stellaria solaris* (Linnaeus, 1758). Lectotype herein designated, collection Uppsala University, Linnaeus collection nr. 717.

Stellaria paucispinosa Kosuge & Nomoto, 1972

Stellaria solaris paucispinosa Kosuge & Nomoto, 1972: 4.
Xenophora (*Stellaria*) *solaris* (Linnaeus, 1764) [in part] – Ponder, 1983: 50, figs 6a, 10b, 13e, 29k-m.
Stellaria solaris (Linnaeus, 1764) [in part] – Kreipl & Alf, 1999: 66, pl. 22 fig. 20a, c.

Original description. – "The shell is low conical in shape and rather thin. The protoconch consists of about 2½ whorls which are glossy and almost smooth, with fine growth lines. Adult whorls are 5½ in number, earlier whorls to the ante-penultimate or the penultimate whorl are ornamented with the fragments of the other shells which .is common character of the family Xenophoridae. The shell surface is sculptured with coarse spiral cords, which run down obliquely with irregular interspaces, and are crossed by somewhat corrugated growth lines. These undulating spiral cords produced into nodules below the sutures. Long spinous projections arise around the periphery and are ten to thirteen in number on the body whorl, The periphery of the body whorl is thickened and elevated. The base slightly concave and is sculptured further with radial cords which are granulated being crossed by spiral grooves. The umbilical area is widely perforate. The aperture is large and elliptical in shape, and is callused within and on half of the umbilical area ; the columellar lip is rather thick. The color is dull white with some pale orange-yellow with an orange brown callus." from Kosuge & Nomoto, 1972: 4-5.

Holotype. – Holotype in Coral Museum, Tatsukushi, Tosa Shimizu City, Japan (Nappo et al., 2022). W 93 mm.

Type locality. – Gulf of Aden, off Aden, 85 m depth.

Distribution. – Indian Ocean, widely distributed in rather deep water. Gulf of Aden, off Aden (85 m) (Kosuge & Nomoto, 1972). Red Sea (36-229 m), Gulf of Oman (82 m), India (18-55 m), Sri Lanka (Mienis, 1980, 2001). All specimens from eastern Africa and the Red Sea to western Thailand in Ponder (1983: fig. 39) can be attributed to this species. Somalia, off Ras Hafun; Madagascar, off Tulear; off Mozambique; South Africa, off Natal; 35-200 m (Nappo et al., 2022).

Comparison. – See *Stellaria solaris*.

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A new species of *Rostellariella* Thiele, 1929 (Gastropoda, Rostellariidae) from Papua New Guinea

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ABSTRACT

A new species of *Rostellariella* is described and distinguished from all other members of the genus by its shell morphology. This new species was previously misidentified as *Rostellariella delicatula* (G. Nevill, 1881) from Papua New Guinea and is herein described as *Rostellariella aurea.*

Key words – Rostellariidae, *Rostellariella delicatula*, Papua New Guinea

INTRODUCTION

The superfamily Stromboidea comprises a clade of morphologically distinctive gastropods that include the iconic Strombidae, or 'true conchs', as well as several other extant and extinct families. One of these families is Rostellariidae Gabb, 1868. Irwin et al. (2021, 2024) treated Rimellidae Stewart, 1927 as a junior synonym of the Rostellariidae, but it was subsequently reinstated as a valid family by Dekkers (2026). The relationships among the families, genera, and available species based on COI data is illustrated in Fig. 1.

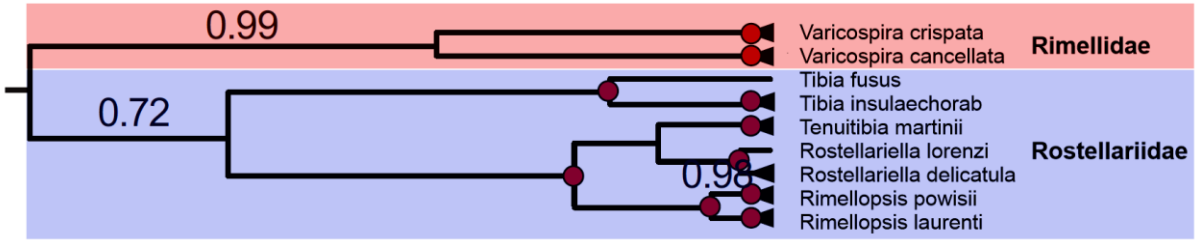

Fig 1. Bayesian analysis of COI sequences (after Irwin et al., 2024: 828, fig. 2) showing the relations of the Rimellidae and the Rostellariidae.

The molecular study of Irwin et al. (2024) included at least one representative from 87% of currently recognised stromboidean genera (MolluscaBase, 2023), comprising 93 recognised species represented by 381 newly sequenced specimens. Specimen data are provided in Irwin et al. (2024, Supplementary Material S2: 2).
One particularly interesting taxon included the dataset is *Rostellariella delicatula* (G. Nevill, 1881), a deep-water species known from the northern Indian Ocean. In the above-mentioned Supplementary Material S2, 28 sequenced specimens are listed as *R. delicatula*. During my visit to the MNHN, I examined the voucher specimens used for the cox1 sequencing, all of which originated all from Papua New Guinea. Although all were labelled as *R. delicatula*, they were immediately recognised as representing an undescribed species, which is described below. Most specimens were juveniles, although a few adults were also present.

ABBREVIATIONS

AMD	(The collection of) Aart M. Dekkers, Purmerend, the Netherlands
MNHN	Muséum national d'Histoire naturelle, Paris, France
L	shell length
W	width of the shell at its broadest point (not counting the dents)

METHODS

During a visit to the MNHN, voucher shells of Stromboidea deposited in the museum collections were examined and photographed. The specimens were compared with similar material in the author's collection and with descriptions and illustrations in the relevant literature.

TAXONOMY

Superfamily Stromboidea Rafinesque, 1815
Family Rostellariidae Gabb, 1868

Genus *Rostellariella* Thiele, 1929
Type species *Rostellaria delicatula* G. Nevill, 1881, by monotypy

***Rostellariella aurea* sp. nov.**

(Pl. 1 Figs 1a-c)
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Rostellariella delicatula G. Nevill, 1881 – Irwin et al., 2024: figs 2-3, supplementary materials [not of G. Nevill, 1881]

Description. – Shell of average sized for genus, slender, fusiform and sturdy. Protoconch paucispiral, small, broad and flattened. Spire comprising about 12 regularly expanding whorls bearing moderately raised, rather broad, former varices. Spire whorls nearly straight sided, with only shallow sutural indentations. Whorls sculptured with numerous evenly spaced punctate grooves. Punctations minute, shallow and closely spaced. Sculpture on early whorls smoother, possibly as a result of wear. Punctate grooves gradually become obsolete on the more inflated body whorl. Body whorl slightly subquadrate. Aperture narrowly ovate, occupying about half the shell length including anterior canal. Anterior canal relatively short, narrow, and curved to the right in ventral view. Posterior canal short, directed dorsally. Columella covered by a thick white callus, broadest anteriorly at the base of anterior canal. Interior of outer lip and both canals heavily calloused and pure white. Outer lip sturdy, not thickened, bearing 5 short, blunt spines. Shell uniformly golden yellow, with orange tinges adjacent to suture and at the anterior end.

Holotype. – Papua New Guinea, off Mambara Bay, latitude -7.85 longitude 148, cruise BIOPAPUA station CP3729, collected by trawl, 8 October 2010, 575–655 m depth, MNHN-IM-2013-64503, H 89.5 mm, W 29 mm (Pl. 1 Fig. 1).

Paratypes. – All from Papua New Guinea, BIOPAPUA cruise. The 27 additional specimens used for the molecular study by Irwin et al. (2024: Supplementary Material 2).

Type locality. – Papua New Guinea, off Mambara Bay, latitude -7.85, longitude 148.

Distribution. – Only known from the southeast side of Papua New Guinea, at north of Naitabe, Astrolabe Bay, Gulf of Huon, Mambara Bay, west of Kairiru Islands and southeast of New Britain. For details, see Irwin et al. (2024: Supplementary Material 2).

Etymology. – The specific epithet *aurea* is derived from the Latin adjective *aureus*, meaning "golden yellow", and refers to the characteristic golden-yellowish colour of the shell.

Comparison. – *Rostellariella delicatula* is a well-known deep-water species originally described from the Bay of Bengal, Myanmar (formerly Burma) (G. Nevill, 1881: 262) and subsequently recorded from India (off Madras, AMD), the Andaman Sea, and the Arabian Sea (Bosch et al., 1995). This distribution is geographically distant from that of the new species, occurring in a different ocean basin. *Rostellariella delicatula* is frequently encountered in the international shell trade.
Rostellariella aurea sp. nov. differs from *R. delicatula* in having a slenderer shell and spiral sculpture consisting of punctate grooves, whereas *R. delicatula* bears only spiral threads. In the typical form of *R. delicatula*, the outer lip bears 4 denticles, whereas *R. aurea* sp. nov. consistently has five. In addition, *R. delicatula* possesses white spiral bands on the outer surface of the outer lip, terminating at the lip denticles, a feature absent in the new species. Finally, *R. delicatula* is cream-colored, whereas *R. aurea* sp. nov. is characterized by a distinctive yellowish-orange shell.

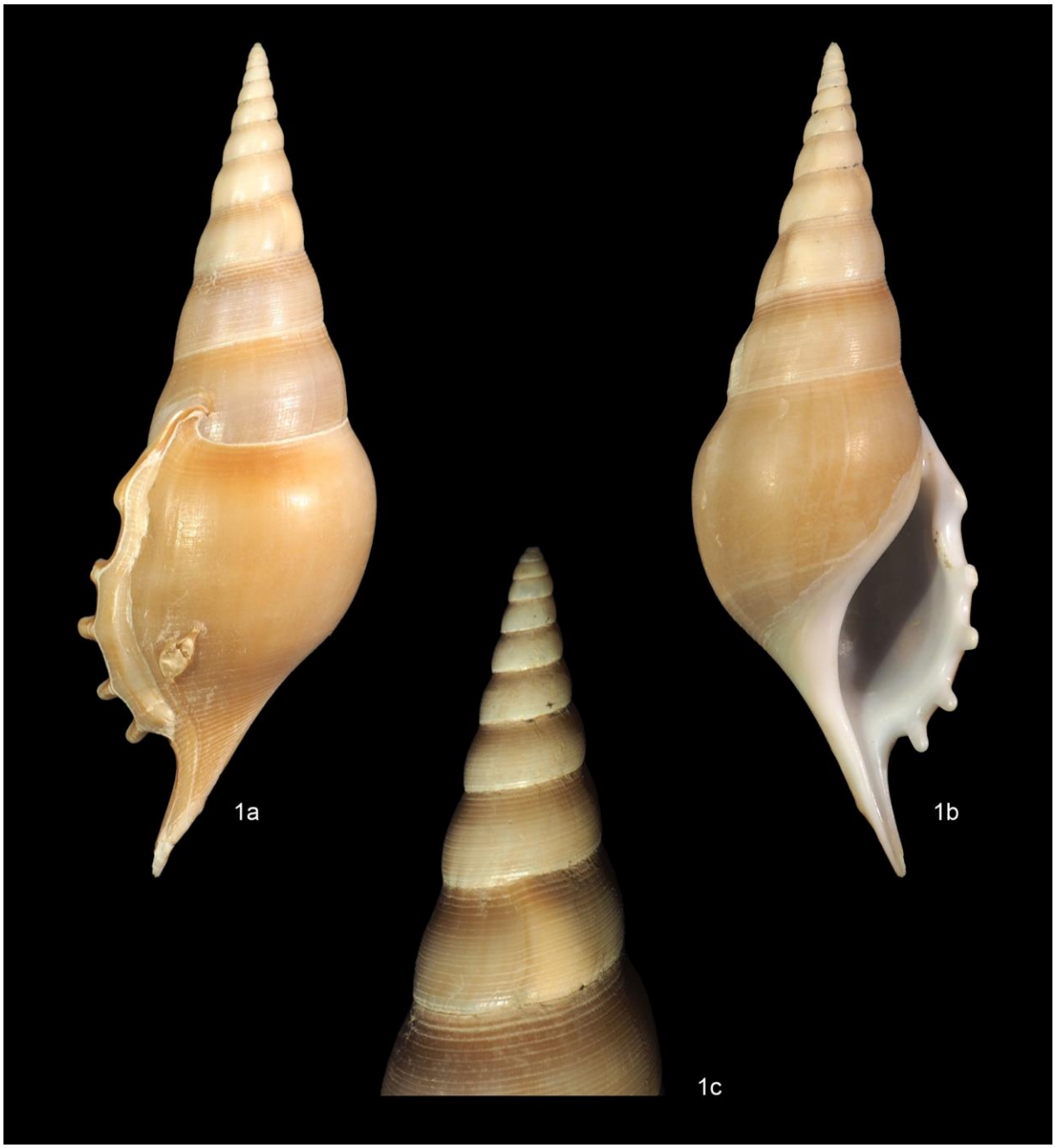

Plate 1. ***Rostellariella aurea* sp.,** Holotype MNHN-IM-2013-64503, Papua New Guinea, off Mambara Bay. L 89.5mm. Photos by the author.

Rostellariella turcki Dekkers, 2020, from south-eastern Java, Indonesia (off the southern coast of Pandagaran Bay), is even more slender and attains a larger size than the new species. It also possesses 5 denticles on the outer lip. However, *R. turcki* is characterized by the presence of narrow white spiral bands on the outer surface of the lip that extend onto the apertural spines, whereas these are absent in *R. aurea* sp. nov.

Rostellariella lorenzi Morrison, 2005, distributed from the Arafura Sea to southern Indonesia, is readily distinguished by its spiral sculpture of smooth ridges lacking punctations and by the presence of conspicuous dark brown axial color bands. Although this is the geographically

closest known congener to *R. aurea* sp. nov., it occurs on the opposite side of Papua New Guinea.
Rostellariella barbieri Morrison, 2008, described from the Philippines, is very similar to *R. lorenzi* and differs from *R. aurea* sp. nov. in the same way, namely by the presence of conspicuous brown axial color bands. The species is known only from the type series and may prove to be conspecific with *R. lorenzi*, as the reported Philippines locality is possibly erroneus.

REMARKS

Rostellaria aurea sp. nov. was identified as *Rostellaria delicatula* G. Nevill, 1881 by Gijs Kronenberg in 2019, and specimens assigned to that species were subsequently included under that name in the molecular study of Irwin et al. (2024).

ACKNOWLEDGEMENTS

I thank Philippe Bouchet and the staff of the MNHN for granting me access to the museum's voucher specimen collection, enabling me to study and photograph the stromboidean specimens. I am especially grateful to Barbara Bouge and Virginie Héros for their assistance and pleasant cooperation. I also thank Priscillia Gael Bourguignon (MNHN) for providing the cruise station list, and Henk Dekker (Winkel, the Netherlands) for preparing the plate and Fig. 1. Thanks go out to Andrea Nappo (Decimomannu, Italy), for review and correcting the English.

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A new species of *Amoria* J. E. Gray, 1855 (Gastropoda, Volutidae) from Western Australia

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ABSTRACT

This paper presents a new species of *Amoria* J. E. Gray, 1855 from deep water of Western Australia, off the coast of Geraldton and Dongara. *Amoria paulcoxi* sp. nov. is characterised by the form of the protoconch, coloration, and pattern of five darker bands of flecks and dark spots below the sutures on later whorls. The new species is sharing similarities, such as the four columella plaits and outer lip formation, with other species in the genus. The three presently recognized subspecies of *Amoria damonii* J. E. Gray, 1864 are elevated to species level.

Key words – Volutidae, *Amoria*, new species, Western Australia, deep water, taxonomy

INTRODUCTION

Western Australian deep waters are generating renewed malacological taxonomic interest through the discovery of numerous new species (e.g. Bail & Limpus, 2014; Zheng et al. 2026). The use of remotely operated vehicles (ROVs) has enabled researchers to selectively search for novel taxa within an environmentally friendly framework that does not cause significant disruption to the benthic fauna that previous extraction methods had, such as trawling. Similarly, historical bycatch from octopus fishers has provided a rich source of

environmentally friendly collected material. Much of the current research work undertaken by the authors would not be possible if it was not for the generosity of these fishers who share their material free of charge and in doing so contribute greatly to the advance of deep water malacological research in Western Australia, an area of research that many of the state institutions have neglected.

Australian volutid studies have recently undergone a renaissance, with many species complexes being subjected to substantial revision (Zheng & Maxwell 2025a, b, c, 2026; Zheng et al. 2026). Much of this work has drawn on biogeographical distinctions, enabling a more nuanced understanding of radiation patterns, as demonstrated by studies from Queensland (Maxwell & Berschauer 2023). *Amoria* J. E. Gray, 1855 is a commonly encountered volute genus that has a large diversity in form and species within the waters of Western Australia. The genus currently contains 37 living and 2 fossil accepted species (MolluscaBase, 16 April 2026). The fauna of Western Australia has seen the introduction of several new *Amoria* species: *Amoria chaneyi* H. Morrison, 2012; *Amoria peterstimpsoni* T. Cossignani & Allary, 2019; *Amoria textilata* Y. Zheng & Maxwell, 2025. This paper adds to the growing number of species within *Amoria* that have recently been described from Western Australia.

ABBREVIATIONS

BSRF BlueSky Research Foundation Collection, Cairns, Queensland
DSC Drew Strickland Collection, Geraldton, Western Australia
RWC Ray Walker Collection, Busselton, Western Australia
WAM Western Australian Museum, Welshpool, Western Australia
YZC Yao Zheng Collection, Perth, Western Australia
L Length of the shell

METHODS

This study uses shell morphological information to describe a new species. Genetic material (the shell) was available for this study, but the cost of undertaking that task was outside the funding scope of the authors.

TAXONOMY

Superfamily Volutoidea Rafinesque, 1815
Family Volutidae Rafinesque, 1815

Genus *Amoria* J. E. Gray, 1855
Type species *Voluta turneri* J. E. Gray, 1834, by subsequent designation Harris, 1897

***Amoria paulcoxi* sp. nov.**

(Pl. 1, Pl. 2 Fig. A, Pl. 3 Fig. A, Pl. 4. Fig. A)

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Plate 1. ***Amora paulcoxi*** **sp. nov.** Holotype, Geelvink Passage, off Geraldton, octopus traps, 50-55 m, L 59.6 mm (BSRF0041).

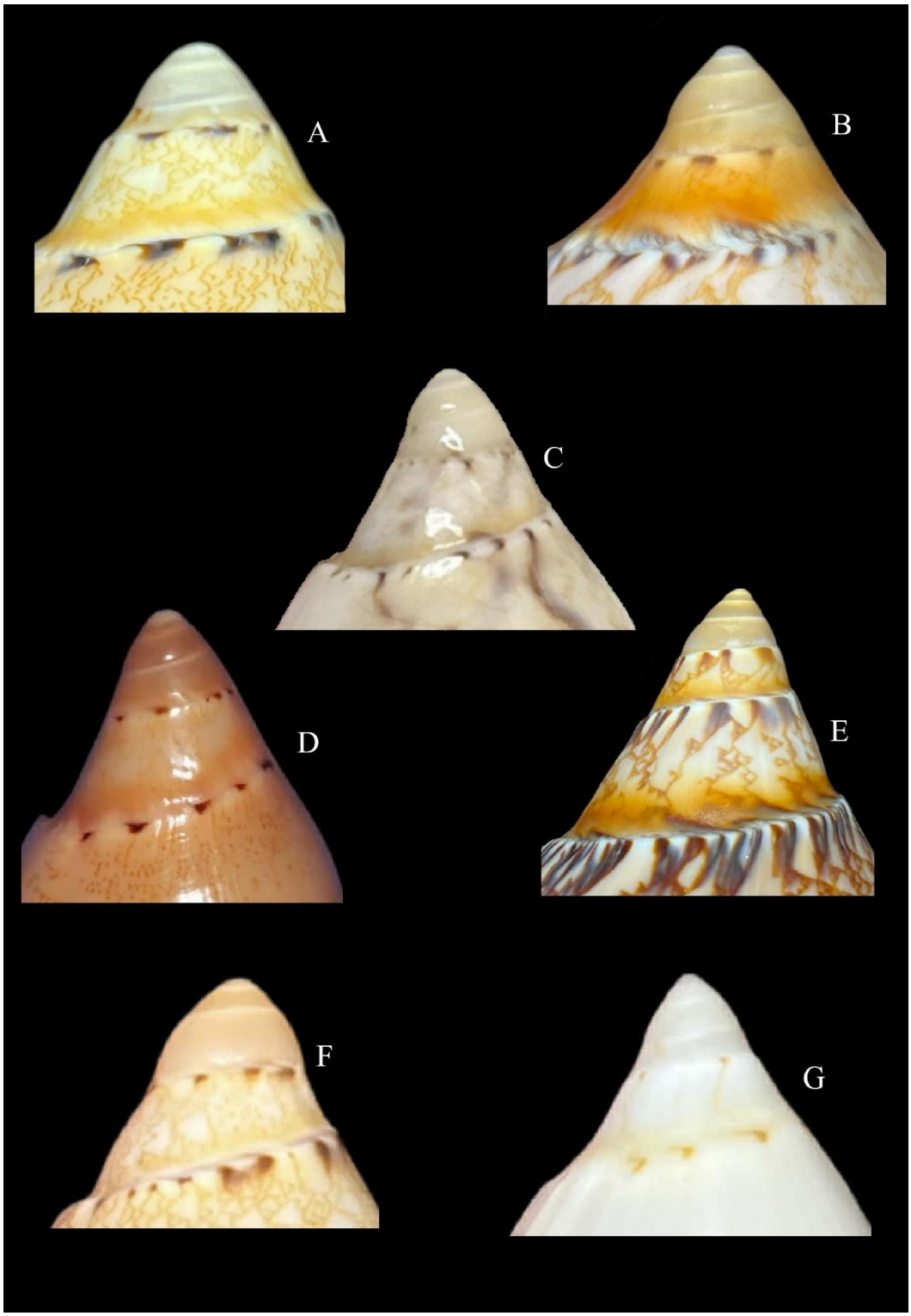

Plate 2. Comparative plate of Western Australian *Amoria*, apexes. A. ***A. paulcoxi* sp. nov.**, paratype 1, west off Dongara, octopus traps, 50-60 m, L 59.2 mm (DSC). B. ***A. reevii*** (G. B. Sowerby II, 1864), Dampier Archipelago, 50-60 m, L 93.2 mm (YZC). C. ***A. textilata*** Y. Zheng & Maxwell, 2025, Ashmore Reef, Middle Lagoon, L 58.9 mm (WAM S51200). D. ***A. chaneyi*** H. Morrison, 2012, Coral Bay, 124 m, L 49.5 mm (RWC). E. ***A. damonii*** J. E. Gray, 1864, Port Hedland, L 119 mm (YZC).

Description. – Shell of medium size, ovately elongated and solid, with a length of 59-60 mm; protoconch smooth, flattened with four pale whorls, graduating from white to cream axially on whorls before the development of patterns of flecks on the two smooth teleoconch whorls which are almost straight; sutures shallow and pale with a preceding band of orange-yellow that developed out of the flecked whorl; a row of dark dashes just below the slightly stepped suture; body whorl smooth, widest near mid body, and covered in flecks that form five dark bands interspaced by bands with a reduction of fleck count; aperture with sharp lip joining below the suture; posterior canal shallow, anterior not extending past the base of body whorl; darker coloured interiorly becoming lighter towards the labrum with a dark band immediately below the labrum; columella distinct in upper aperture with slight toning of yellow orange posteriorly; having four distinct white plaits.

Holotype. – Western Australia, Geelvink Passage, off Geraldton, octopus traps, 50-55 m, H 59.6 mm (BSRF0041).

Paratype. – Paratype 1, Western Australia, west of Dongara, octopus traps, 50-60 m, H 59.2 mm (DSC).

Type locality. – Western Australia, Geelvink Passage, off Geraldton.

Distribution. – Known from off the central Western Australian coast at depths of 50-60 m.

Etymology. – Named in honour of the renowned fisher Paul Cox of Geraldton, who obtained this material some years ago, and which is now coming to light in old collections.

Comparison. – *Amoria paulcoxi* differs from the other members of this genus in the shape of the protoconch, which is much blunted than others, as opposed to *A. chaneyi* H. Morrison, 2012 (Pl. 2 Fig. D, Pl. 3 Fig. D; Pl. 4 Fig. D), *A. damonii* J. E. Gray, 1864 (Pl. 2 Fig. E, Pl. 3 Fig. B; Pl. 4 Fig. B), and *A. whitworthi* Bail & Limpus, 2001 (Pl. 2 Fig. H, Pl. 3 Fig. F; Pl. 4 Fig. F) which are more acute. The protoconch of *A. praetexta* (Reeve, 1849), *A. textilata* Y. Zheng & Maxwell, 2025 (Pl. 2 Fig. C, Pl. 3 Fig. H; Pl. 4 Fig. H) and *A. reevii* (G. B. Sowerby II, 1864) (Pl. 2 Fig. B, Pl. 3 Fig. C; Pl. 4 Fig. C) are mamillated in form. The slightly stepped suture of *A. paulcoxi* differs from the distinctly stepped *A. damonii* and *A. praetexta*, nor is the suture as smooth as in *A. chaneyi* and *A. whitworthi*. The pattern of the *A. paulcoxi* clearly differentiates it from others *Amoria*, the darker mottled pattern of *A. damonii,* or the paleness of *A. whitworthi*. The pattern of the body whorl of *A. paulcoxi* with is flecks is not dissimilar to *A. reevii*; with the new species differing in the banding and in the colour of the teleoconch lacking the deep red-orange of *A. reevii* that dominates the penultimate whorl; nor does it have the distinctive convex penultimate whorl of that species. The form of the anterior sinus in *A. paulcoxi* does not have acuteness in the outer lip found in *A. chaneyi* or *A. textilata.*

Remarks. – The *Amoria damonii* species group is regarded to consist of three subspecies by Bail & Limpus (1996, 2001). These are: *A. damonii damonii* J. E. Gray, 1864; *A. damonii ludbrookae* Bail & Limpus, 1996; *A. damonii reevii* (G. B. Sowerby II, 1864). They are still regarded as subspecies by MolluscaBase (2026). Based on the morphological differences and known geographical distributions, they are here regarded to be separate species. Both the

subspecies *damonii* and *ludbrookae* have overlapping distributions in northern Australia (Bail & Limpus, 1996: 3), so a clear indication they are two different valid species.

ACKNOWLEDGEMENTS

We thank Drew Strickland of Geraldton, who kindly provided the material for study and donated the holotype to enable this work to proceed. We thank Ray Walker, Busselton, Western Australia, for the use of his magnificent *Amoria chaneyi*. We thank Trevor and Marguerite Young of Myrtle Bank, South Australia, for providing remarks and proofreading this paper.

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Plate 3. Comparative plate of Western Australian *Amoria*, ventral views. A. ***A. paulcoxi* sp. nov.**, paratype 1, west of Dongara, octopus traps, 50-60 m, L 59.2 mm (DSC). B. ***A. damonii*** J. E. Gray, 1864, Port Hedland, 119 mm (YZC). C. ***A. reevii*** (G. B. Sowerby II, 1864), Dampier Archipelago, 50-60 m, L 93.2 mm (YZC). D. ***A. chaneyi*** H. Morrison, 2012, Coral Bay, 124 m, L 49.5 mm (RWC). E. ***A. whitworthi*** Bail & Limpus, 2001, Coral Bay, 50-60 m, L 48.8 mm (YZC). F. ***A. praetexta*** (Reeve, 1849), Exmouth Gulf, Bundegi Beach, 43 mm (YZC). G. ***A.* textilata** Y. Zheng & Maxwell, 2025, Middle Lagoon, Ashmore Reef, 58.9 mm (WAM S51200).

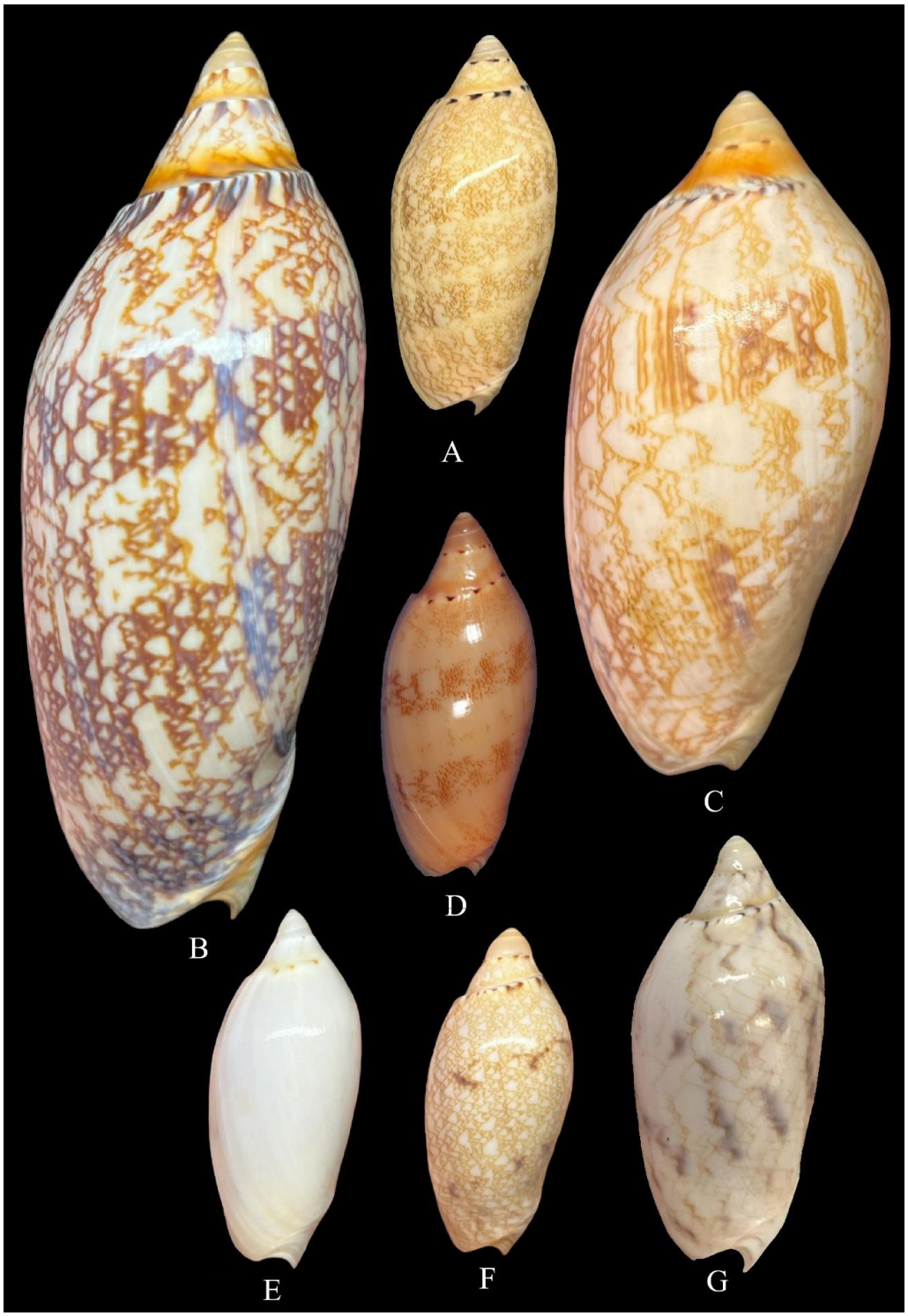

Plate 4. Comparative plate of Western Australian *Amoria*, dorsal views. A. ***A. paulcoxi* sp. nov.**, paratype 1, west of Dongara, octopus traps, 50-60 m, L 59.2 mm (DSC). B. ***A. damonii*** J. E. Gray, 1864, Port Hedland, 119 mm (YZC). C. ***A. reevii*** (G. B. Sowerby II, 1864), Dampier Archipelago, 50-60 m, L 93.2 mm (YZC). D**. *A. chaneyi*** H. Morrison, 2012, Coral Bay, 124 m, L 49.5 mm (RWC). E. ***A. whitworthi*** Bail & Limpus, 2001, Coral Bay, 50-60 m, L 48.8 mm (YZC). F. ***A. praetexta*** (Reeve, 1849), Exmouth Gulf, Bundegi Beach, 43 mm (YZC). G. ***A. textilata*** Y. Zheng & Maxwell, 2025, Ashmore Reef, Middle Lagoon, 58.9 mm (WAM S51200).

A note on the genus *Psammocola* Blainville, 1824 (Bivalvia, Psammobiidae) by determining the identity of its type species

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ABSTRACT

The two different usages of the genus *Psammocola* Blainville, 1824 in previous publications is confusing. The original type species is *Psammocola vespertinalis* Blainville, 1824 by monotypy, but the identity of this species is debated. It is here shown that this type species is a junior synonym of the species known as *Asaphis deflorata* (Linnaeus, 1758). Thus, *Psammocola* is a junior synonym of *Asaphis* Modeer, 1793.

Key words – Bivalvia, Psammobiidae, *Psammocola*, *Gobraeus*, *Asaphis*, synonymy

INTRODUCTION

In the 18th and 19th century the binomial nomenclature was still emerging after the early start of Linnaeus, 1758. The concept of designating type species for newly introduced genera and subgenera was not known to early authors, resulting subsequently in confusion about the newly introduced names. The different views of authors could be eliminated by subsequent designation of the type species for a genus. But apart from the name of the original or later designated type species, its identity also needs to be known to understand what the author had in mind when establishing the newly introduced genus or subgenus name. One case for a genus and species of Psammobiidae is detailed below.

TAXONOMY

Superfamily Tellinoidea Blainville, 1814
Family Psammobiidae J. Fleming, 1828

Psammocola Blainville, 1824

Blainville (1824: 349-350) introduced the genus *Psammocola* as new, with three "sections" indicated by the letters A, B and C. For every section he mentioned one species as example.

Section A. Example: *Psammocola vespertinalis*, introduced as new species by Blainville (1824: 349) in the same work. He referred to a figure in the 'Tableau encyclopédique et méthodique' by Bruguière, 1797: pl. 231 fig. 3a-c. See below for a discussion about this species. Blainville used the French vernacular "Les Psammocole capsoïdes" for this section, based on the genus *Capsa*, heading of Bruguière's plate 231.

Section B. Example: *Psammocola virgata*, originally described as *Psammobia virgata* Lamarck, 1818, and now known as *Gari* (*Gobraeus*) *virgata* (Lamarck, 1818).
Blainville referred to *Psammobia* Lamarck, 1818 (as French vernacular Psammobie Lamarck) for this section. Blainville (1824: 350) considered that this section contained the 18 species listed by Lamarck (1818: 512-516).

Section C. Example: *Psammocola violacea*, originally described as *Psammotaea violacea* Lamarck, 1818, and now considered to be *Gari* (*Psammotaena*) *elongata* (Lamarck, 1818).
Blainville referred to *Psammotaea* Lamarck, 1818 (as French vernacular Psamotée Lamarck) for this section. Blainville (1824: 350) considered that this section contained the 8 species listed by Lamarck (1818: 517-518).

According to the ICZN (art. 10.4), sections should be interpreted as subgenera. So, the above more properly written is:
Section A = *Psammocola* (*Psammocola*)
Section B = *Psammocola* (*Psammobia*)
Section C = *Psammocola* (*Psammotaea*)

Type species. – Blainville (1824) did not select a type species for his new genus *Psammocola*, but he mentioned *Psammocola vespertinalis* as new species in his Section A [= *Psammocola* (*Psammocola*)], so this species is the type species of *Psammocola* by monotypy. Bucquoy, Dautzenberg, & Dollfus (1895: 485) correctly mentioned *Psammocola vespertinalis* as the type species. However, they treated this name as junior synonym of *Psammobia* (*Psammocola*) *depressa* (Pennant, 1777).

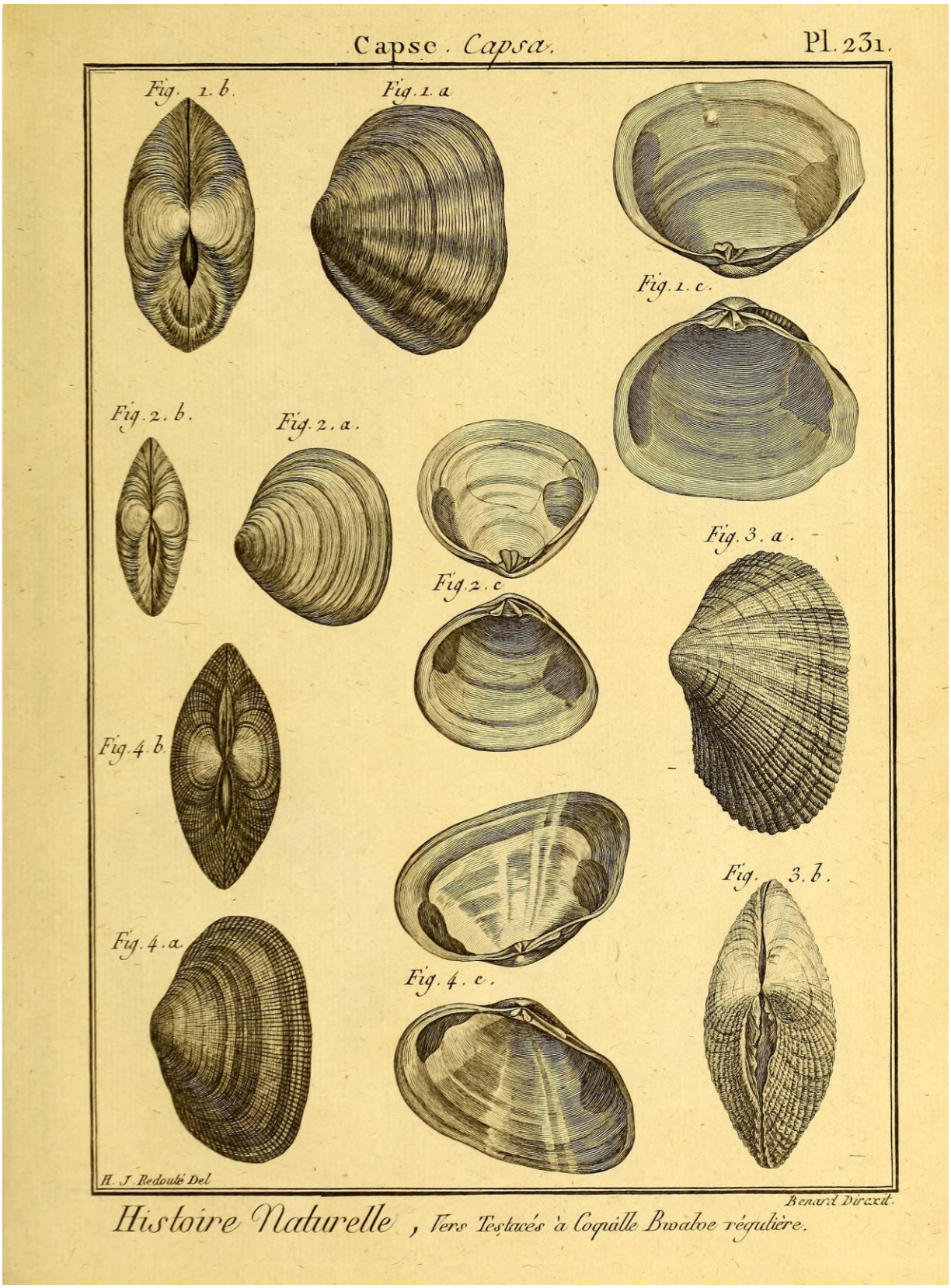

Fig. 1. Plate 231 from Bruguière, 1797 of his genus *Capsa*. Fig. 4a-c show the illustrations to which Blainville, 1824 referred when introducing his new species *Psammocola vespertinalis*. In fig. 3a-b *Asaphis violascens* (Forsskål in Niebuhr, 1775) is illustrated.

Psammocola vespertinalis Blainville, 1824

The identity of *Psammocola vespertinalis* Blainville, 1824 should be determined. Blainville (1824: 350) referred to a figure in the 'Tableau encyclopédique et méthodique' by Bruguière, 1797: pl. 231 fig. 3a, b, c. But fig. 3c does not exist, there is only fig. 3a, b (Fig. 1). However, there is fig. 4a, b, c on this plate, where fig. 4c shows the inside of the valves with hinge details (Fig. 1). Blainville (1824: 349) gives details about the hinge of his new species, translated from French as "with two inward, oblique, divergent teeth in each valve, but larger in the left". This makes it likely that the actual illustration of his species *P. vespertinalis* is pl. 231 fig. **4a-c**. This very good drawing represents the species now known as *Asaphis deflorata* (Linnaeus, 1758). Bruguière's pl. 231 fig. 3a, b (Fig. 1) illustrates *Asaphis violascens* (Forsskål in Niebuhr, 1775).

The confusion about the identity of *Psammocola vespertinalis* Blainville, 1824 started with Blainville himself in 1825. In his 'Manuel de malacologie et de conchyliologie' he copied the text of his 1824 work, including the reference to Bruguière, 1797: pl. 231 fig. 3a, b, but newly added references to the plates in this work (to be published later in 1827). For the afore mentioned species he added a reference to his pl. 77 fig. 4 (Fig. 2). But this figure depicts *Gari depressa* (Pennant, 1777), not the expected *Asaphis* species. But this *Asaphis* species is figured on the same plate, pl. 77 fig. 6 (Fig. 2) as 'Sanguinolaire rugueuse'. The genus 'Sanguinolaire' is mentioned in the text (1825: 568), but this species is not mentioned. It refers to *Sanguinolaria rugosa* Lamarck (1818: 511), for which Willan designated a lectotype (1993: 6, fig. 16). This figured lectotype is a fine radially ribbed shell that could represent *Asaphis violascens*, as Willan suggested, but more likely corresponds to *Asaphis deflorata*, the species to which Lamarck referred it. Finally, we can conclude that Blainville in his 1825 work should have referred to pl. 77 fig. 6 instead of pl. 77 fig. 4 for his *Psammocola vespertinalis*.

Probably early workers on mollusks would have the "Manuel" of Blainville, 1825 readily available, but not the many parts of the "Dictionnaire des sciences naturelles", where the text on *Psammocola* appeared already in 1824. As there was not an indication in his 1825 work that it was copied from his 1824 work, many early workers would have taken his text of 1825 for the original text, which pointed to a different figured species for *Psammocola verpertinalis* than his original 1824 work.

One could think of finding the solution to the disorder in Blainville's work itself. He treated the genus *Psammocola* in the 43rd part of the "Dictionnaire" in 1826 (pages 482-483). Here Blainville indicates that he introduced his new genus *Psammocola* to combine the Lamarckian genera *Psammobia* and *Psammotaea*, as the differences mentioned by Lamarck between those two genera are certainly insufficient to separate them properly. This statement is inconsistent with what he had actually written in 1824 and repeated in 1825! Instead of synonymizing both Lamarckian genera, he introduced a new genus and a new species. He continues with the remark [translated]: One could include *Sanguinolaria* without objection, and in doing so, one would obtain the genus *Capsa* as originally proposed by Bruguière.

Probably the publication of the Mollusca parts in the 'Dictionnaire' (1816-1845; 61 volumes) and the 'Manuel' (1825, 1827) was a great undertaking to accomplish for Blainville in his time. This could be the reason for the inaccuracies present in the 1824 text and copied in the

1825 text. 1, a reference to the wrong figure on the plate in the 'Encyclopedie', see above (pl. 231 fig. 3a, b, c, instead of pl. 231 fig. 4a, b, c). 2, reference is made to *Psammotaea* Lamarck, 1818, in French vernacular as Psamotée instead of Psammotée. 3, Blainville mentioned that the number of species which Lamarck (1818) listed for his first Section [A] was 18 and the second Section [B] was 8, but this should have been his second Section B and third Section C respectively.

Later authors were still confused about the status of *Psammocola* Blainville, 1824. Keen in the 'Treatise' treated it as incorrect synonym of *Gari* (*Gobraeus*) T. Brown, 1844 (1969: N631), as "[=*Psammocola* de Blainville, 1825, Auctt. (*non* de Blainville, 1824) (obj.)]" and she regarded *Psammocola* a synonym of *Asaphis* Modeer, 1793 (1969: N633), although with mentioning incorrectly a subsequent type designation by Bucquoy, Dautzenberg, & Dollfus, 1895 instead of the monotypy. Here synonymy is correct.
Later, Willan (1993: 5) treated *Psammocola* (in part) as synonym of *Asaphis*, on page 60 he indicated it is a synonym of *Sanguinolaria* Lamarck. What he meant is *Sanguinolaria* Lamarck, 1799 sensu Deshayes (1835: 167-168), who regarded that only *Sanguinolaria rugosa* Lamarck, 1818 is a real *Sanguinolaria* species. As *S. rugosa* is a synonym of *Asaphis deflorata* (see above), Willan indicated in a difficult way here also that *Psammocola* is a synonym of *Asaphis*.
Huber (2010) in his 'Compendium of bivalves' treated *Psammocola* as synonym of *Asaphis* and *Psammocola vespertinalis* Blainville, 1824 as a synonym of *Gari* (*Gobraeus*) *depressa* (T. Pennant 1777). This is very curious as *vespertinalis* is the type species of *Psammocola* and therefor should be a species of *Asaphis*, not of *Gari* Schumacher, 1817.

CONCLUSIONS

- Blainville's original 1824 text is misleading about the nomenclatural status of the names he introduced. His later treatments were so significantly different, they exacerbated the confusion.
- The genus *Psammocola* Blainville, 1824 is a junior synonym of *Asaphis* Modeer, 1793.
- The type species of *Psammocola* is *Psammocola* (*Psammocola*) *vespertinalis* Blainville, 1824, by monotypy.
- The name *Psammocola* (*Psammocola*) *vespertinalis* Blainville, 1824 is a junior synonym of *Asaphis deflorata* (Linnaeus, 1758).

REMARKS

In literature (Huber, 2010), the genus *Asaphis* in the Indo- West-Pacific is regarded monospecific, with the species *Asaphis violascens* being widely distributed. Richard Willan (pers. comm. 21 July 2026) studied specimens from Polynesia that are conchologically identical to *A. deflorata* in having numerous, fine ridges. This would point that there might be a second (undescribed) species present in the Pacific, but genetics should solve this problem. A third *Asaphis* species does not alter the opinion of the status of *Psammocola* and its type species.

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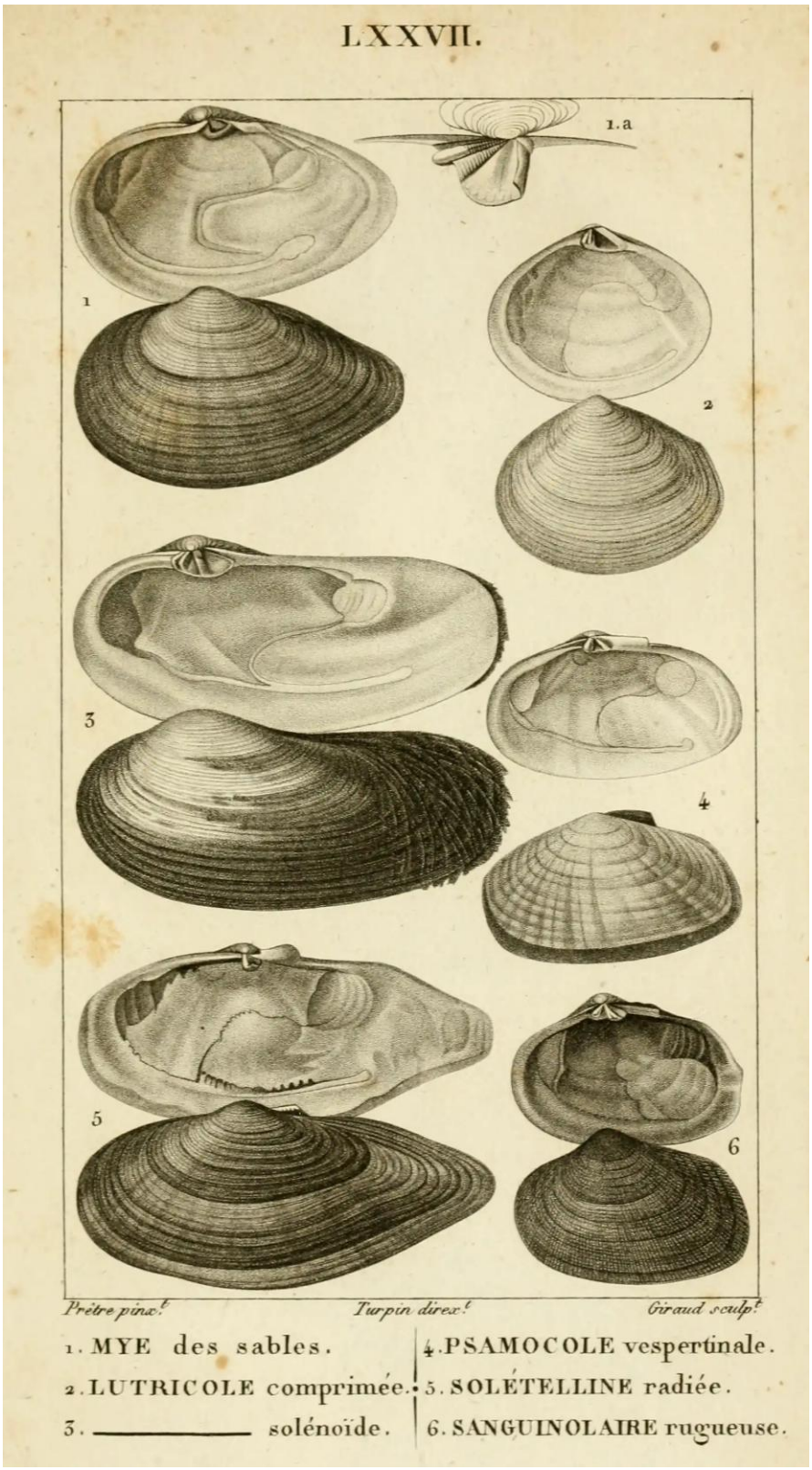

Fig. 2. Plate 77 from Blainville, 1827. Fig. 4 is the illustration to which Blainville (1825) referred when mentioning his species *Psammocola vespertinalis* Blainville, 1824. In fig. 6 *Sanguinolaria rugosa* Lamarck, 1818 is illustrated.

On *Lambis lambis* (Linnaeus, 1758) from the type locality (Indonesia, Ambon) and the recognition of *Lambis camelus* (J. E. Gray in King, 1826) (Gastropoda, Strombidae)

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ABSTRACT
Five live-collected specimens of *Lambis lambis* (Linnaeus, 1758) from the type locality, Ambon, Indonesia, were preserved in 96% ethanol for future research. The species is redescribed based on these topotypic specimens and compared with *Lambis camelus* (J. E. Gray in King, 1826), herein recognized as a valid species from India. Recent molecular evidence indicates that *L. lambis* represents a complex of at least three species, with *L. camelus* forming one member of this complex. Lectotypes are designated for *Strombus lambis* Linnaeus, 1758 and *Strombus camelus* J. E. Gray, 1826.

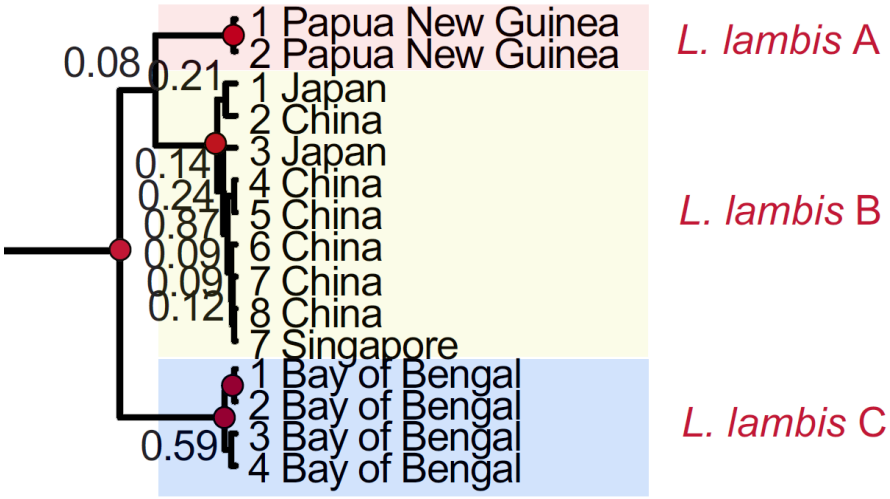
Key words – Strombidae, *Lambis*, taxonomy, Indonesia, India

INTRODUCTION

Lambis lambis (Linnaeus, 1758) is among the most common and widely distributed species of *Lambis* Röding, 1798. It is also one of the few marine gastropods in which shell characters show pronounced sexual dimorphism beyond size. Male shells are usually about 60% the size of female shells, although the degree of dimorphism varies geographically. It is strongest in the Caroline Islands and in many, though not all, parts of the Philippines, Indonesia, Queensland and the Solomons, and less evident in the Indian Ocean and at the eastern edge of the range, including New Caledonia, Fiji and Tonga. In extreme male specimens, the three lowest labial digitations are short and posteriorly hooked; in females, these digitations are two to three times longer and strongly curved upward. Females usually also bear a large, pinched, somewhat bilobed knob on the dorsal shoulder, whereas males have two small, similarly sized

nodules. The two posterior-most digitations are generally more widely separated in females than in males (Abbott, 1961: 151).

As currently interpreted, the common species *Lambis lambis* represents a complex of several species. Although this may seem unexpected to many Strombidae researchers, close examination of numerous shells from different localities reveals substantial variation that corresponds with regional distribution, as already noted by Abbott (1961). It is therefore plausible that *L. lambis* comprises several closely similar species, a conclusion also supported by the molecular study of Indo-Pacific specimens by Irwin et al. (2024) (Text fig. 1).



Text figure 1. The split of *Lambis lambis* in three different species. Figure adapted from Irwin et al. (2024: fig. 2), based on Bayesian analysis of COI sequences. *Lambis lambis* C is herein considered to be *Lambis camelus* (J. E. Gray in King, 1826).

Lambis lambis is known for sexual dimorphism: males have smaller shells with shorter digitations, whereas females have larger, more robust shells, often with upward-curved digitations. Of the many synonyms of *L. lambis*, nearly all refer to male shells (Abbott, 1961: 153). The female shell has received only one other name, *Strombus camelus* Chemnitz, 1788 [non-binomial], which was validated by J. E. Gray in King in 1826 (Abbott, 1961: 153). This name is not recorded in MolluscaBase (accessed 2026-06-22) and is discussed below. The present article provides a basis for further study of the *Lambis lambis* complex.

ABBREVIATIONS

AMD	(the collection of) Aart M. Dekkers, Purmerend, the Netherlands
MNHN	Muséum national d'Histoire naturelle, Paris, France
L	shell length
LA, Length A	measured from first digitation (near apex) to end of anterior spine
Length B	measured from tip of the apex to end of anterior spine
W	width of the shell at its broadest point, outside lip

METHODS

For several years, the first author has collected shells of *L. lambis* from as many Indo-Pacific localities as possible for research and comparison. This year, through a Dutch friend travelling in Ambon, Indonesia, we obtained five shells with animals preserved in 96% ethanol for illustration and future molecular analyses. Ambon was designated by Abbott (1961: 153) as the type locality of *L. lambis*. The specimens were collected by snorkeling with local people who gather this species for food, from a nearshore reef at 0.5–2 m depth. Immediately after collection, the animals were removed from the shells and preserved in 96% ethanol. For transport to the Netherlands, the animals were removed from the alcohol and frozen; after thawing, they were returned to alcohol. The shells were cleaned only superficially. Three animals with their corresponding shells were donated to the MNHN: MNHN-IM-2019-54322, MNHN-IM-2019-54323 and MNHN-IM-2019-54324.
Using Abbott's (1961) treatment of *Lambis lambis* and the molecular results of Irwin et al. (2024), which indicate at least three species within the *L. lambis* complex, we reviewed the existing literature to assess this taxonomic problem.

TAXONOMY

Superfamily Stromboidea Rafinesque, 1815
Family Strombidae Rafinesque, 1815

Genus *Lambis* Röding, 1798
Type species *Strombus lambis* Linnaeus, 1758, by absolute tautonymy

Pterocera Lamarck, 1799. Type species *Strombus lambis* Linnaeus, 1758, by monotypy
Heptadactylus Mörch, 1852. Type species *Strombus lambis* Linnaeus, 1758, by subsequent designation Abbott, 1961
Millepes Mörch, 1852. Type species *Strombus scorpius* Linnaeus, 1758, by subsequent designation Kobelt, 1878
Harpagus Vernus, 1892. Junior homonym. Type species *Strombus scorpius* Linnaeus, 1758, by monotypy

***Lambis lambis* (Linnaeus, 1758)**
(Text Fig. 2, Pls 2-7)

Strombus lambis Linnaeus, 1758: 743.
Lambis lamboides Röding, 1798: 66.
Lambis cerea Röding, 1798: 66.
Lambis maculata Röding, 1798: 67.
Lambis lobata Röding, 1798: 68.
Lambis hermaphrodita Röding, 1798: 68.
Lambis laciniata Röding, 1798: 68.

Uncertain synonym, see Remarks: *Lambis adamii* Bozzetti & T. Cossignani, 2003: 3-5

Redescription. – Shell rather small for the genus, relatively broad, short-spired and heavy for its size. Spire whorls concave, with a strong cord just above the suture. The first, upper digitation is not attached to the spire; the upper whorls are free and visible only in dorsal view. Last whorl broadly expanded toward the apertural rim, with strong, blunt nodules on the shoulder: two dorsally and one laterally. A second strong cord bears more numerous but weaker blunt nodules, and a third cord below it is evenly spaced from the preceding one. The strong cords continue into the digitations, with the shoulder cord ending in three digitations; only the first, upper digitation lacks cord support. Labial digitations short, thick and bent backward, especially along the labrum. Aperture nearly straight and narrow, bright orange within. The hollow interior of the large left dorsal knob is clearly visible in the upper part of the aperture. Columella covered by a broad, thick enamel layer; apertural rim broad and thickly calloused. Anterior canal broad, short and strongly twisted. Periostracum light brown and thick when not obscured by algal growth.
Shell colour beige, with irregular brown maculations.

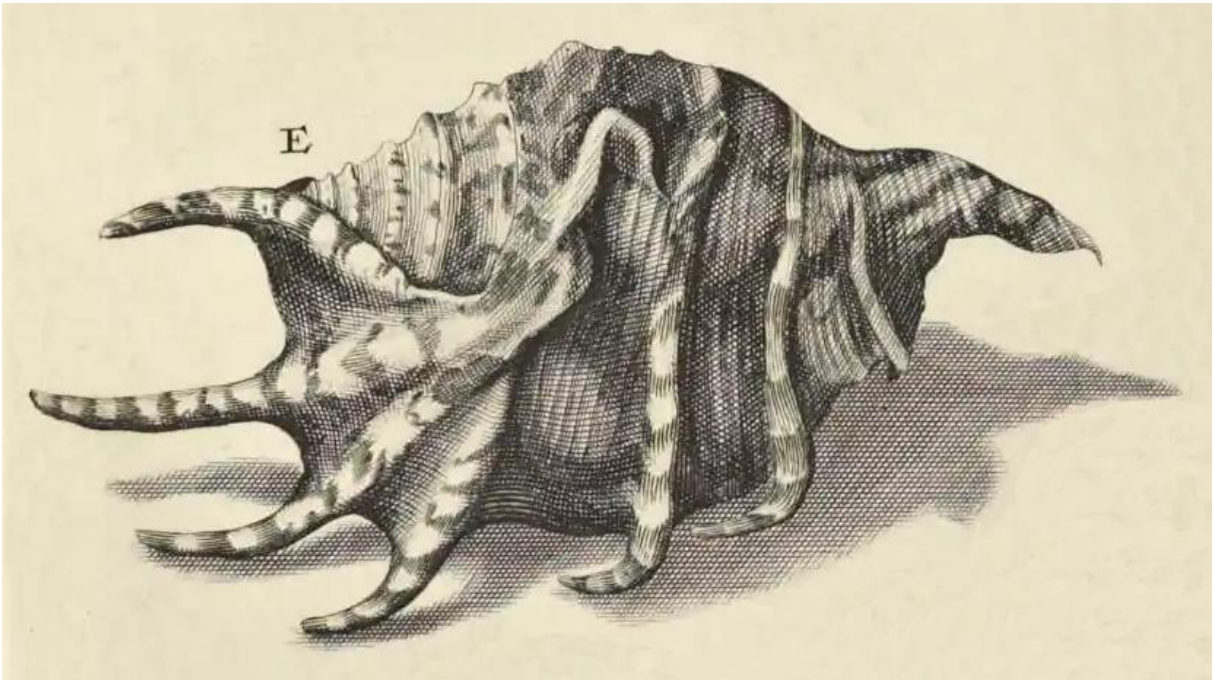
Types. – Although Abbott (1961: 153) restricted the type locality to Indonesia, Amboina (Ambon), he did not select a lectotype from the syntypes, nor did later authors. The syntypes are the specimens studied by Linnaeus and shells figured in his cited literature references.
Linnaeus cited (1758: 743):
Barrel. rar. 1326. f. 7.
Bonan. recr. 3, t. 315.
Rumph. mus. t. 35. f. E. F.
Gualt. test. t. 35. f. C. t. 36. f. A.
Argenv. conch. t. 17. f. E.
Kratzenst. Regenf. 16. t. 4. f. 45.

Here we select as lectotype the shell figured by Rumphius, 1705: pl. 35 fig. E (Text fig. 2).

Topotypes. – All from the type locality Ambon, with animal preserved in 96% ethanol. Three in collection MNHN (MNHN-IM-2019-54322, MNHN-IM-2019-54323, MNHN-IM-2019-54324) and two in AMD. The location where these five animals were collected is Indonesia, Ambon, north side of Baguala Bay, desa Suli, Pantai Sopapei (Pl. 1). Their measurements are listed in Table 1.

Deposit	Shells	Lenght A	Lenght B	Width	B/Width
MNHN-IM-2019-54322	(Plate 2)	84.7	71.5	40.5	1,77
AMD STR4631	(Plate 3)	93.2	81.3	51.5	1,58
MNHN-IM-2019-54323	(Plate 4)	118.3	108.3	66.4	1,63
AMD STR4632	(Plate 5)	102.3	92.7	ca 55	1,69
MNHN-IM-2019-54324	not illustrated	103	96.6	55.5	1,74

Table 1. Measurements of the *Lambis lambis* topotypes.



Text figure 2. *Lambis lambis*. Rumphius, 1705, pl. 35 fig. E. Lectotype, herein selected.

Type locality. – "Habitat in Oceanus Asiae" (Linnaeus, 1758). Further restricted to Indonesia, Ambon by Abbott (1961: 153). This restriction is based on Rumphius (1705), one of the references Linnaeus mentioned.

Distribution. – The distribution of *L. lambis* remains uncertain because the limits and ranges of the species within the complex are not yet resolved. At present, the species can be confirmed only from the waters around Ambon; specimens from other localities may belong to different species.

Comparison. – At present, comparison of *L. lambis* with other possible members of the complex is meaningful only in relation to *L. camelus*; see the account of that species below. The five available shells of *L. lambis* are all relatively small (Table 1). Their small size may reflect local collecting pressure, as larger shells provide more meat, but no ecological data are available to confirm this. The collection site, on the north side of Baguala Bay (= Teluk Baguala), Pantai Sopapei (Pl. 1), is a weed-covered reef enclosing a sandy lagoon near the coast. The bay is relatively clean and usually calm, offering no obvious explanation for the small size of the specimens. Alternatively, small size may be characteristic of the species if *L. lambis* proves to be a local, possibly endemic, Moluccan species. This hypothesis should be tested using sequences from the animals preserved in the MNHN wet collection.

Remarks. – Because of its small size and isolated distribution in the southernmost part of Mindanao, Philippines, *Lambis adamii* Bozzetti & T. Cossignani, 2003 may represent a valid species. It has not yet been recorded from Indonesia; Sulawesi is the nearest Indonesian island, but no records from there are known to us. Shells sold internationally as *L. adamii*

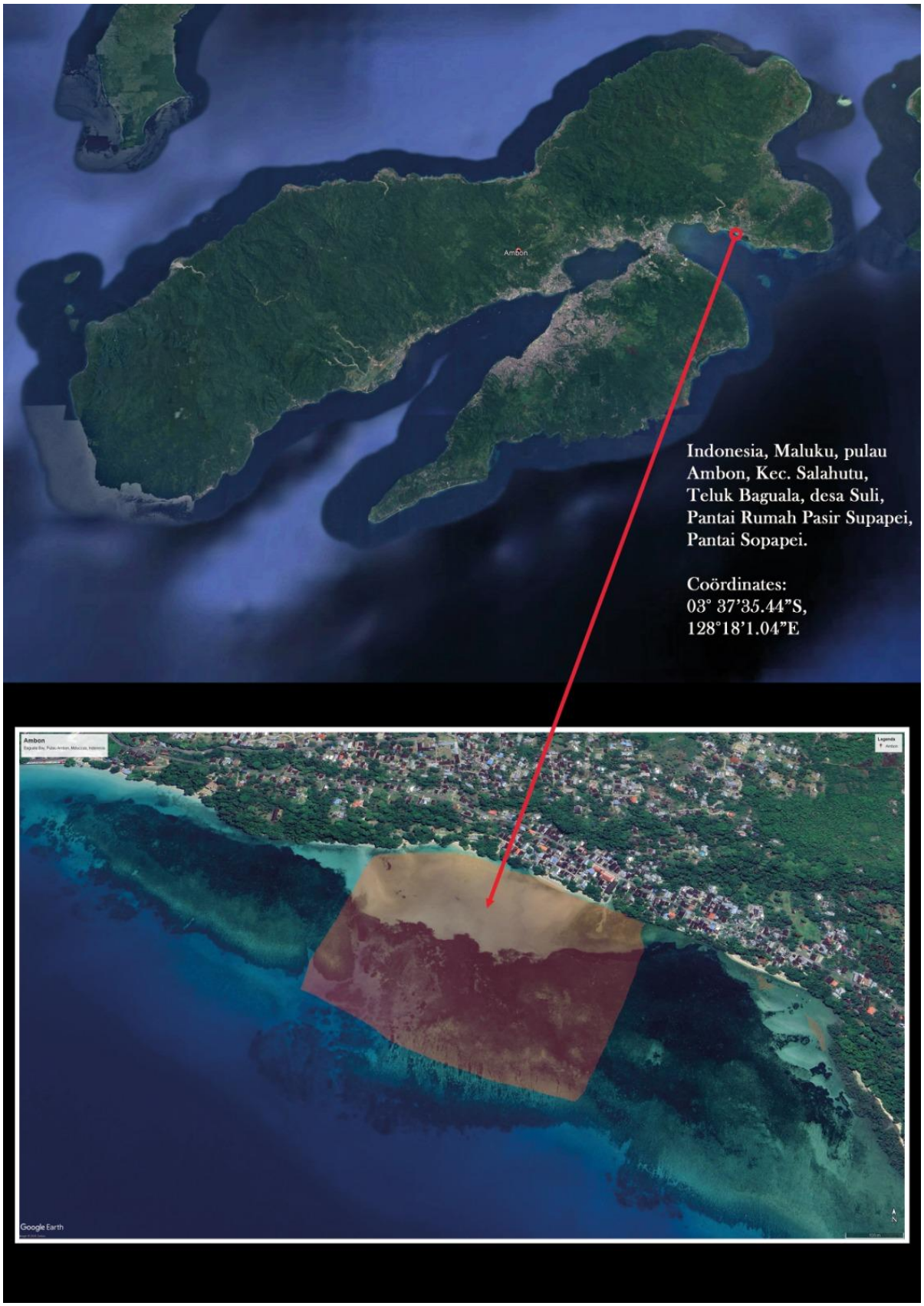


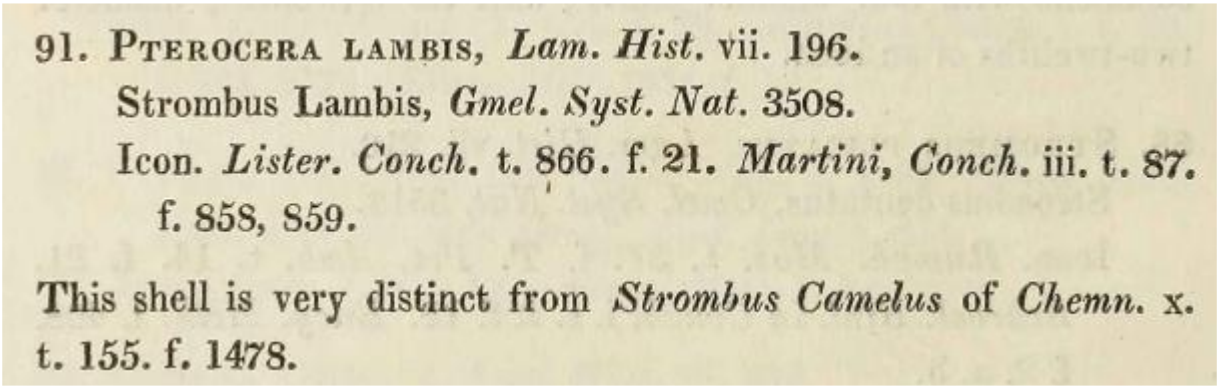
Plate 1. The collection site of topotypes of *Lambis lambis*.

vary considerably in form. In addition to typical *L. adamii*, some specimens resemble small, slender Philippine *L. lambis* and may represent another species within the *L. lambis* complex. Given the small but distinctive true *L. lambis* from Ambon, and the molecular evidence of Irwin et al. (2024) indicating at least three distinct species in the complex, these shells may indeed represent a separate species.

***Lambis camelus* (J. E. Gray in King, 1826)**

(Pls 8-10)

Strombus camelus Chemnitz, 1788: 205, pl. 155 fig. 1478 [non binomial].
Strombus camelus "Chemnitz" Gray, 1826: 490 (Text fig. 3).
Strombus camelus Chemnitz – Menke, 1830: 72.
Strombus camelus Gray in King, 1826 – Abbott, 1961: 153.
Strombus camelus Chemnitz, 1788 – Martynov, 2002: 5, pl. 2 figs C-D.
Lambis (*Lambis*) *lambis* – Subba Rao, 2003: 148, pl. 27 figs 3-5
Lambis lambis – Apte, 2014: 59, pl. 6 fig. 3
Lambis (*Lambis*) *lambis* – Dey, 2016: 183, figs 357-358
Lambis lambis – Patterson Edward et al., 2022: 142, text fig.
Lambis lambis C – Irwin et al. 2024: 8, Supplementary Material S2: MH908185, MKH908189.


91. PTEROCERA LAMBIS, *Lam. Hist.* vii. 196.
Strombus Lambis, *Gmel. Syst. Nat.* 3508.
Icon. *Lister. Conch.* t. 866. f. 21. *Martini, Conch.* iii. t. 87. f. 858, 859.

This shell is very distinct from *Strombus Camelus* of *Chemn.* x. t. 155. f. 1478.

Text figure 3. The validation of the name *Strombus camelus* by J. E. Gray in Appendix B, Mollusca, in King (1826: 490).

Description. – "*Strombus Camelus*, *testa ovata, alata, gibbere maximo inter congeners distincta, septem dactylis feu digitis longissimis aduncis instructa, fauce laevissima lutescente, parietibus internis faseia castaneo- coffea coloratis*." Chemnitz, 1788: 205. Translated: The shell is ovate, winged, with a very distinct hump discriminating it among congeners, equipped with seven very long, hooked dactyls or fingers, aperture very smooth and yellowish, interior walls colored in a chestnut-coffee shade.

Additional description. – Shell large for the genus. Spire whorls rather flat, with a strong ridge just above the suture on the earlier whorls; this ridge becomes obsolete on the later spire

whorls, which are therefore nearly flat. First digitation attached to the spire. Digitations relatively slender, straight and sharply pointed.

Types. – There are two syntypes in the Zoological Institute of St. Peterburg, Russian Federation. One syntype is figured in Chemnitz (1788: pl. 155 fig. 1478) and by Martynov (2002: pl. 2 figs C-D). This figured shell is herein selected as lectotype (Pl. 8 figs 1a-b). The second syntype, a not fully adult shell, becomes the paralectotype (Pl. 9 figs 1a-b).
Other material studied. – Sri Lanka: AMD STR2887, 118 mm. India, Tuticorin: dived, 2-5 m, covered with a tick honey-brown periostracum, AMD STR2888, STR2889, STR2890 (Pl. 10 figs 1a-b), STR2891.

Type locality. – Nicobar Islands. Chemnitz, 1788: 206, "Fast vor wenig Jahren hat man diese Gattung gefleckter Krabben, welche einen so ungleich großen Höcker oder Buckel und so lange starkgekrümmte Zacken haben, bei den Stranden der Nicobarischen Eilande entdecket". Translated: Just a few years ago, this species of spotted crab, which has such unevenly sized humps or bumps and such long strongly curved spines, was discovered on the beaches of the Nicobar Islands.

Distribution. – India, Sri Lanka (both AMD), Nicobar Islands (Chemnitz, 1788).

Etymology. – *Camelus* refers to the prominent dorsal humps, which resemble those of a camel.

Comparison. – This species is relatively large for the genus. The first spine is attached to the spire, whereas in *L. lambis* from Ambon the first digitation is free from the spire. Ambon specimens of *L. lambis* are small and broad, with a strong spiral cord above the suture that extends along the entire spire and does not become obsolete as it does in *L. camelus*. *Lambis lambis* from Ambon has rather thick, short labral digitations that curve backward, whereas those of *L. camelus* are longer, straighter, more slender and sharply pointed.

Remarks. – The name was validated by J. E. Gray (1826: 490) (Text fig. 3), based on a figure in Chemnitz (1788). Part of Johann Chemnitz's well-known collection, described in his *Conchylien Cabinet*, was rediscovered in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (Martynov, 2002). This material includes the shells of *Strombus camelus*, which remain available for study. Although the shells were not examined directly, the two sequences used by Irwin et al. (2024: 8) from the Bay of Bengal (Supplementary Material S2: MH908185, MKH908189) are here attributed to *Lambis camelus*, as this species appears to be the only representative of the *Lambis lambis* complex in those waters.

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Plate 2. *Lambis Lambis* (Linnaeus, 1758). Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei, LA 84.7 mm, MNHN-IM-2019-54322.

Plate 3. *Lambis lambis* (Linnaeus, 1758). Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei, LA 93.2 mm, AMD STR4631.

Plate 4. *Lambis lambis* (Linnaeus, 1758). Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei, LA 118.3 mm, MNHN-IM-2019-54323.

Plate 5. ***Lambis lambis*** **(Linnaeus, 1758)**. Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei. Not fully adult, but with light brown periostracum. LA 102.3 mm, AMD STR4632.

Plate 6. *Lambis lambis* (Linnaeus, 1758). Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei. Animals. Fig. 1. MNHN-IM-2019-54322. Fig. 2. AMD STR4631. Fig. 3. MNHN-IM-2019-54323.

Plate 7. *Lambis lambis* (Linnaeus, 1758). Indonesia, Ambon, north side of Baguala Bay, Pantai Sopapei. Animals. Fig. 1a-b. AMD STR4632. Fig. 2a-b. MNHN-IM-2019-54324.

Plate 8. *Lambis camelus* J. E. Gray, 1826. Lectotype herein designated, on the beaches of the Nicobar Islands (Chemnitz, 1788), L. 192 mm, Zoological Institute of St. Peterburg, nr. ZIN No. 12.

Plate 9. ***Lambis camelus*** **J. E. Gray, 1826**. Paralectotype, on the beaches of the Nicobar Islands (Chemnitz, 1788), Zoological Institute of St. Peterburg, nr. ZIN No. 11.

Plate 10. *Lambis camelus* J. E. Gray, 1826. India, Tamil Nadu, Tuticorin, dived at 2-5 m, with periostracum, LA 191 mm, AMD STR2890.

NOTES

NOTES

Author guidelines

General

Articles are subjected to peer review. Papers must be written in Britsch English and use the metric system. Please submit your manuscript by e-mail, for addresses see the inside of the front cover. Your manuscript has to be submitted as a MS Word file with tables and figure legends included. Figures should be sent as separate files. If files are too large to be send by e-mail (>20 Mb), use e.g. www.wetransfer.com.

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  - Book:
    Lorenz, F. & Fehse, D. (2009). The living Ovulidae. A manual of the families of allied cowries: Ovulidae, Pediculariidae and Eocypraeidae. Hackenheim: Conchbooks. 651 pp.
  - Book chapter:
    ter Poorten, J. J. (2011). Cardiidae. Pp. 186-255. In: G. T. Poppe, ed. Philippine marine mollusks, vol. 4. Hackenheim: ConchBooks. 676 pp.

References in the text

Author names are followed by year of publication and page and/or figure. Possible are “Lorenz & Fehse (2009: 109, pl. 143 figs 1-8)”or “(Lorenz & Fehse, 2009: 109, pl. 143 figs 1-8)”. Two authors are mentioned and connected by "&". Three, or more, authors are abbreviated to only the first author followed by "et al.".

Figures

Text figures for e.g. habitat photos are numbered separately. Figures can be combined to form plates, each plate starting with nr. 1. Figures of the same specimen (shell) should be numbered with letters, e.g. 8a, 8b, 8c. Use Arial 11 pt to number all the figures on the plate. Maximum size for plates is 155 × 190 mm (300 dpi). The legend should fit on the same page, so reduce the plate height to fit more extensive legends. Figures should be submitted preferably as tif or high quality jpg.

Figure legends

Please follow this example.
Plate 2. Comparable other species of *Ministrombus*. Fig. 1a-b. ***M. variabilis*** (Swainson, 1820), Thailand, Gulf of Thailand, Ban Talokapo, leg. B. Gras, H 46.5 mm, AMD STR3613A. Fig. 2a-b. ***M. caledonicus*** S. J. Maxwell, 2022, New Caledonia, Noumea, H 36.9 mm, AMD STR2602.

Locations

Locations should be arranged in declining order, e.g. first the country, then the region, then exact place, etc.

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